VOL. XXVIII NEW YORK—THURSDAY, MARCH 20, 1913—CHICAGO NO. 12

The AUTOMOBILE

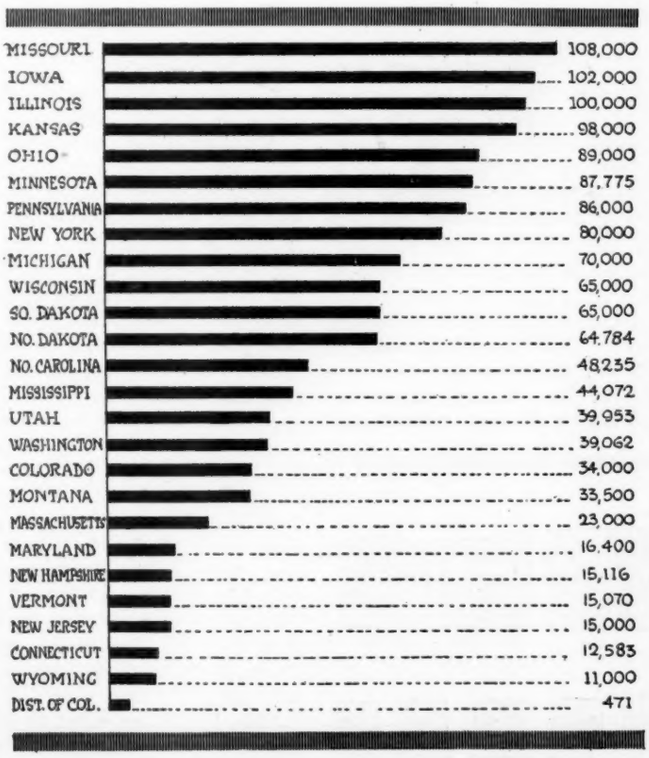
Road Building in the United States

Statistics from Thirty States Representing More than 1,300,000 Miles of All Types of Road Show What It Costs To Make Improved Highways Throughout the United States

DURING the year 1912 $62,691,425 was spent by twenty-nine states and the District of Columbia in the construction of good roads. It is impossible to obtain data from the remaining states for various reasons. They have either no organized road department, or are still in an experimental stage, or have no accurate cost-keeping system. The twenty-nine states which are named in the table published on page 667 are of interest, however, because they have gone into the matter in such a way that data on the construction of American roads is at last becoming obtainable.

New York spent more money than any other state in the Union. During the year of 1912 approximately $15,000,000 was expended on the highways of this state. More than 3,000 miles of new road were built and more than 10,000 miles of highway were shaped, crowned and standardized as to width. There are more than 80,000 miles of various kinds of roads throughout the state of New York, 11,000 of which may be classed as improved roads. It cost the state $1,363 per year for each mile of improved road, including the new construction work.

Illinois spent $7,500,000 during the fiscal year ending July 1, 1912. There are 100,000 miles of roads in the state, of which approximately 10 per cent. are improved. The improved roads consist of gravel, crushed stone and macadam, while the remaining 90,000 miles of unimproved roads are dirt. Many of the dirt roads are excellent and are cared for by local authorities. The State Highway Department secures its funds from appropriations made at each session of the Legislature, that for the past fiscal year being $100,000. The township road and bridge funds for the state amount to approximately $6,000,000, and in addition there is a hard road tax of $1,500,000. The state commission maintains a force of bridge and road engineers whose services are furnished the township officials when requested. The commission itself has no authority over road and bridge matters, and the advice given by its engineers can be taken or not as seen fit by the township authorities. It cost the state of Illinois $750 per year for each mile of improved highway, including construction work, figured on the basis of last year's reports.



Comparative diagram showing the total miles of road in the twenty-nine states and the District of Columbia, the only divisions of the United States in which figures are obtainable at the present time

Iowa has a total of 102,000 miles of highway, upon which it has spent during the past year $7,000,000. There are but 2,500 miles of improved highway in the state, of which a very small percentage is macadam. There are between 2,000 and 3,000 miles of stone road in the state, while the remaining 100,000 miles are dirt. Scattered sections of the roads are faced with gravel or some bituminous material. Most of the roads built during 1912 were dirt, the small percentage of gravel and similar roads being negligible in comparison. The money for road building in Iowa is secured by direct taxation, although some of the local

Map of the United States showing the total number of miles of road in each of twenty-nine states and the District of Columbia. No figures are obtainable on other sections of the country

organizations in various parts of the state help buy subscription work.

Washington has 39,062 miles of highway. Of this, 11,896 are improved; 7,826 miles of the improved roads are dirt, while the remaining improved roads are mostly gravel, the total mileage of macadam being but 184. During 1912 there were 400 miles of new roads built. These were chiefly gravel, with some bituminous macadam, water-bound macadam, brick and concrete. The mileage of highway improved last year is 2,000, the work done being chiefly regrading, crowning and draining, and in some cases by the addition of a hard surface. The cost per mile of improved highway was approximately $450 per mile for the year of 1912. This low cost per mile is doubtless due to the large mileage of improved dirt roads which require little labor and practically no foreign material requiring cartage and its ensuing expenses.

Kansas is another state which spent considerable money during the year of 1912 on roads. There are 98,000 miles of highway in the state, of which but 450 miles are improved. The remaining 97,500 are principally dirt. In the construction of new roads and maintenance of the old the state spent $4,975,000. The total of miles of improved highway, as given above, does not include the improved dirt roads which comprise the majority of those listed in the mileage above. The state spent about $50 per mile of road, which would indicate that very little work was done through vast sections of the state, and that it was possible to do what repairing was necessary at a very low figure on account of the great mileage of the dirt roads. Only 60 miles of new roads were built during the year, these being of macadam, gravel, sand-clay and oiled earth.

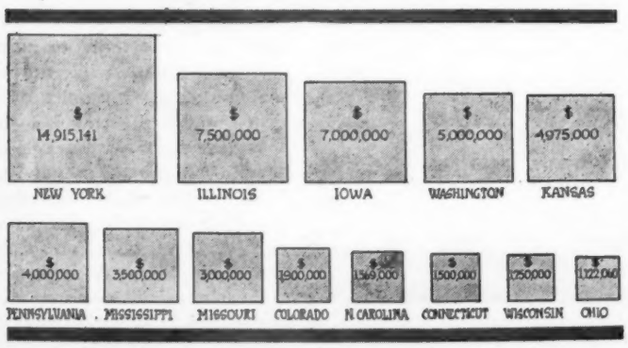


Diagram showing the relative amounts of money spent by all states which expended over $1,000,000 on roads during 1912

Mississippi has a total road mileage of 44,072. Of this 1,000 miles are improved. Of the improved roads 40 miles are macadam, 30 miles are crushed stone and about 500 miles are gravel. One-third of all the improvement work on road-building varies throughout the different counties of Mississippi, but on an average is somewhere in the neighborhood of $30 per mile, according to statistics furnished by the Department of Agriculture and Commerce. Mississippi spent $3,500,000 for roads during the past year. This makes an average of $3,500 per mile of improved road, including the new roads built. This cost is higher than that of other states when it is figured to include 333 miles of road which were improved during 1912.

Pennsylvania has a total road mileage of 86,690, of which 861 miles have been constructed by the State Highway Department. During the year ending September 1, 1912, 4,500 miles of road have been repaired and put in good condition for travel. Four million dollars have been spent on the construction of the new roads and the maintenance of the old. The money for the state highways is appropriated by the State Legislature, which in May, 1911, voted sufficient funds for the two fiscal years ending June 1, 1913. This means that a total of $2,000,000 per year during the years of 1911-1912 and 1912-1913 is available for highway use.

Ohio has 89,000 miles of road. Of this 25,000 is improved highway. The percentage of improved highway, the total highway is probably higher in Ohio than in any other state. Of the improved roads 10,000 miles are macadam and stone, 14,500 of gravel and 500 of brick and concrete. There are 64,000 miles of

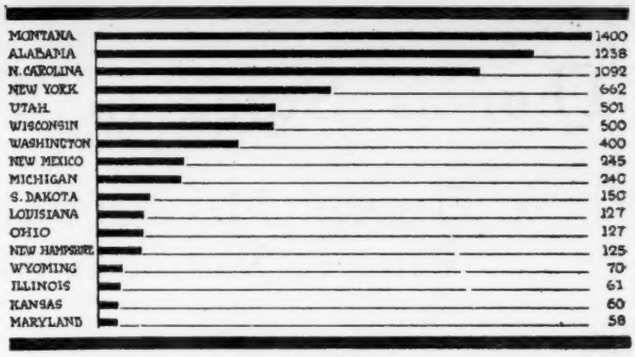
dirt road in the state, most of which are unimproved, but which are passable in good weather. The money spent in Ohio up to October 1 during the year 1912 amounted to $1,122,060. This was all given out in contract work. The cost per mile for the year of improved roads, including those freshly constructed, amounted to $400 per mile. Money is secured by appropriation through the Legislature at Columbus.

Missouri is another state which has spent a large amount of money last year in the construction of roads. About $3,000,000 being spent during 1912. There are 108,000 miles of road in this state, of which 4,750 are improved; 103,250 miles are dirt roads and are in good condition at favorable periods of the year. Of the improved roads the larger part are gravel, this type claiming about 3,500 miles, while the stone roads make up the remainder of 1,250 miles. There is established in connection with the state treasury a fund known as the general state road fund, which shall be used for no other purpose than that of the permanent improvement of the highways within the state.

Wisconsin has approximately 65,000 miles of highway. According to the United States Office of Public Roads there are 10,000 miles of these highways that have been improved, but the number is closer to 12,000. Most of the roads are dirt, but considerable work is being done along the line of macadam. Along the Fox River Valley experimental concrete roads have been constructed for the first time in Wisconsin.

Not a few states are carrying on experimental work with a view of determining the best surface to withstand wear of both climate and traffic and at the same time to be moderately cheap. The state of Illinois, for example, built 61 miles of experimental roads of different types during the year 1912. Results from these are not yet obtainable, but are expected to be of great value in determining cost and advantages of roads of different type.

The vast stretches of roads throughout this country are still of the dirt or earth type. These make excellent surfaces in good weather and after a stretch of bad weather can be restored by dragging. Where the percentage of dirt roads is greater compared to improved roads and macadam, asphalt and other artificial surfaces it will be noticed that the cost per mile of the road is materially less even where the dragging is thoroughly carried out and the dirt road kept in the best possible condition. The main disadvantage of this road is, of course, its tendency to rut wherever traffic is frequent. In the neighborhood of the larger cities and towns throughout the country it is necessary that some such hard artificial surface be used.



Comparison of the number of miles of road constructed in 1912 by those states which have kept records

The majority of states which use convict labor are in favor of this method of maintaining and constructing the roads. There are, however, many dissenting opinions, even among the counties of the states which, as a whole, favor the use of convicts. In Mississippi the question was put to those various counties using convict labor what was thought of it and if it was profitable. Some thought the results were good and others did not. Alcorn County, for instance, says that it costs 80 cents per day for convict labor and the value of the work is 50 cents. It is a loss. Clay County, on the other hand, says it costs 80 cents per day with very good results. Pontotoc County says it costs about $3 per day and the value of the work is about $1.50, and is, therefore, a loss. Greene County says it costs about $1 to handle the convict and the value of the labor is $1.50 per day.

It has always been stated that American road construction was devoted too much to the building of roads and not enough to the maintenance.

TABLE OF HIGHWAY STATISTICS OF ALL STATES IN WHICH FIGURES ARE AVAILABLE.

STATE	Total Miles of Roads in State	Miles Improved Highway	Miles Macadam Roads	Miles Gravel	Miles Asphalt	Miles Dirt	Miles Stone	Miles Brick and Concrete	Other Roads	Miles Built in 1912	Improved in 1912	Money Spent in 1912	REMARKS
Alabama	....	....	....	....	....	....	....	....	..	1,238	3,780	$ 25,332	
Colorado	34,000	300	....	150	....	....	....	....	..	..	250	1,900,000	
Connecticut	12,583	3,030	665	774	....	1,214	6	....	376	..	....	1,500,000	Figures except appropriation are for 1911
Dist. of Col	471	390	94	164	181	....	31	....	3	7	....	223,600	
Illinois	100,000	10,000	....	....	....	90,000	....	....	..	61	....	7,500,000	End fiscal year July 1
Iowa	102,000	2,500	....	4,500	....	100,000	2,500	....	..	Exper.	....	7,000,000	
Kansas	98,000	450	250	....	....	97,500	....	....	200	60	10,000	4,975,000	
Louisiana	....	....	....	....	....	115	....	....	12	127	....	199,931	
Maryland	16,400	382	305	....	....	....	....	2	75	58	165	892,602	
Massachusetts	23,000	20,700	....	....	....	....	....	....	..	..	....	500,000	
Michigan	70,000	1,500	300	....	....	69,700	....	....	1,200	240	....	125,000	Fiscal year ends July 1
Minnesota	87,775	....	....	....	....	....	....	....	..	..	4,305	.....	
Mississippi	44,072	1,000	40	500	....	43,532	30	....	..	..	333	3,500,000	
Missouri	108,000	4,750	....	3,500	....	103,250	1,250	....	3	..	....	3,000,000	
Montana	33,500	7,000	25	....	....	33,475	....	....	..	1,400	....	750,000	
New Hampshire	15,116	1,890	500	1,400	....	....	....	....	..	125	....	450,000	
New Jersey	15,000	4,590	....	....	....	....	....	....	..	..	....	.....	No other information available
New Mexico	....	....	....	7	....	282	....	....	423	245	....	78,613	
New York	80,000	11,052	7,092	....	....	....	8,500	....	4,830	662	11,052	14,915,141	
North Carolina	48,235	3,449.5	1,175	683	89	44,785	....	....	89	1,092	....	1,569,140	Figures for 1911
North Dakota	64,784	64,623	....	161	....	64,623	....	....	75	..	....	700,000	
Ohio	89,000	25,000	10,000	14,500	....	64,000	....	500	..	127	....	1,122,060	
Oklahoma	....	....	....	....	....	....	....	....	..	..	....	20,000	
Pennsylvania	86,690	....	....	....	....	....	....	....	..	..	4,500	4,000,000	For 2 fiscal years ending June 1, 1913
South Dakota	65,000	28,000	11	....	....	64,989	....	....	..	150	2,000	250,000	
Utah	39,953	1,644	47	....	....	1,441	133	....	23	501	....	570,006	
Vermont	15,070	4,000	....	900	....	....	225	....	..	..	190	475 000	
Washington	39,062	11,896	184	2,588	....	34,503	....	....	787	400	2,000	5,000,000	
Wisconsin	65,000	12,000	....	....	....	64,497	....	3	..	500	....	1,250,000	Mostly dirt roads
Wyoming	11,000	2,000	....	....	....	....	....	....	..	70	175	250,000	
Total	1,368,211	222,146	20,688	29,827	270	877,886	13,334	505	8,096	7,063	38,750	$62,691,425	

NOTE.—In the following states either no figures are available or there are no state roads: Arizona, Arkansas, California, Delaware, Florida, Idaho, Indiana Kentucky, Nebraska, Oklahoma, Rhode Island, South Carolina, Tennessee, Texas and West Virginia.

Thomas Stock in Trade Brings $51,000

C. A. Finnegan Makes Purchase—Good Will, Patents and Patterns Valued at $400,000 Included in Sale

BUFFALO, N. Y., March 18—*Special Telegram*—C. A. Finnegan, of the Empire Smelting Co., Depew, N. Y., purchased today, at the receivers' auction in this city, the good will of the E. R. Thomas Motor Co., all of its patents, patterns and stock in trade at the plant here and also at its branch departments in New York, Boston, San Francisco and Los Angeles for $51,000. In the catalog of the receivers these assets of the company were valued at $400,000.

Mr. Finnegan is a former Louisville, Ky., man, and it is reported, by a dispatch from that city, that he is considering Louisville as a location for an automobile manufacturing plant. He formerly headed a similar concern in that city.

The sale opened Monday, March 17, and it is expected that it will be concluded by Friday of this week when the last article to be sold will be the Around-the-World Trophy, presented by *Le Matin* of Paris and the *New York Times* to the Thomas company as winner of the New York to Paris race some years ago. The sale includes 5,843 catalog lots and over 400 bidders are at present in the city looking after various parcels of the sale.

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During yesterday and today many of these parcels have been sold including paints and brushes, automobile tires, electric motors, sheet metal working tools, lathes, electro plating machinery and thirty-five lots of machinery from the experimental shop.

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The new car will be fitted with a four-cylinder, two-cycle block motor with 2.875-inch bore and 3.5-inch stroke having a five-bearing crankshaft, and being suspended at three points. It has no valves nor gears to create noise. The motor operates on either gasoline or kerosene, the makers claiming 30 miles to the gallon. Cooling is by means of a tubular radiator. Wheelbase is 80 inches. The 14-inch steering wheel is to be at the left as well as the control lever. Drive is by friction, the makers claiming a variation from 1 to 60 miles per hour and reverse. A feature of the construction is the use of wire wheels. Chrome nickel steel is used throughout shafts and rear axle and high carbon manganese steel in all parts requiring stiffness. The body is of the English torpedo type and full equipment is standard.

C. H. Lambert is secretary and treasurer of the company, which was incorporated in South Dakota last February for $500,000. Half of this capital is paid in.

Petition Filed Against Bergdoll

PHILADELPHIA, PA., March 17—Three creditors of the Louis J. Bergdoll Motor Co., of this city, instituted proceedings today in the United States District Court to have the motor car company adjudged an involuntary bankrupt.

The creditors who petitioned the court and their claims are: W. C. Rhodes, Inc., $1,696.85; Chilton Co., $505, and the Castle Lamp Co., $1,772.85. It is alleged that during the past 30 days preferential payments amounting in the aggregate to over $33,000 have been made by the automobile company as follows: to Erwin R. Bergdoll, $31,200; C. A. Bergdoll Coal Co., $400, and the North Broad Street Realty Co., $1,500.

An official of the Bergdoll company declared this afternoon that if the proceedings did not interrupt the marketing of the company's output it would continue solvent.

Judgment for Willys-Overland

BUFFALO, N. Y., March 19—(*Special Telegram*)—The Willys-Overland Co., Toledo, O., was awarded a judgment of $5,895.83 against Gustave R. Poppenberg, Buffalo, in a decision filed with the county clerk at Buffalo Tuesday by Clark H. Timerman, referee. The papers filed claim Mr. Poppenberg in 1909, and 1911, was agent in Buffalo for Overland cars. Contract expired in 1910, but Poppenberg was unable to ascertain whether he was to have new contract and consequently in August, 1910, Mr. Poppenberg bought Overland cars amounting to $19,630. But when time came to renew contract Ohio manufacturers refused to grant renewal. Poppenberg demanded settlement of account under previous contract claiming rebates and damages for sales in his territory and other items. Willys-Overland company then sued to recover purchase price of automobiles bought by Poppenberg. Purchase price of cars amounted with interest to $22,675.83, which amount was undisputed by the Poppenberg concern. Timerman, as referee, awarded Mr. Poppenberg in his counter claims $16,780, Willys-Overland Co. securing balance.

Auto-Ette Announces Cyclecar

CHICAGO, March 15—The Auto-Ette Co., Chrisman, Ill., is announcing a light car for $368, which, although of small-car size and of standard tread, is built along cyclecar lines. It has a 96-

inch wheelbase and a 56-inch tread, but uses 26-inch motorcycle wheels and motorcycle tires.

The motor is a De Luxe twin motorcycle motor made by the Spacke Machine Co., Indianapolis, and is rated at 9 horsepower. This is air-cooled and with the two cylinders set at an angle. The engine shaft chain-drive connects to a countershaft with an epicyclic gear in connection, giving two speeds and reverse. From the countershaft the drive is taken by two 28-degree motorcycle belts, thus doing away with differential and tending toward great simplicity. The weight is given as 400 pounds and the speed at from 2 to 50 miles per hour. The Auto-Ette company is planning on 1,000 cars for this year.

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The Niagara Motors Mfg. Co., which recently moved its plant from Buffalo, N. Y., to Dunkirk, N. Y., turned out its first machine from the new factory Saturday, when shipment was made to New Orleans. The company now employs twenty-five men, new machinery is being installed and the average output weekly from the start will be five automobiles.

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G. R. Truck Co. Needs Money

GRAND RAPIDS, MICH., March 17—A committee comprising E. Alfred Clements, L. A. Cornelius, M. Kirsch, Frank T. Hulswit and William F. McKnight has issued a statement to stockholders of the Grand Rapids Motor Truck Co. setting forth the need of additional capital and proposing that the holders of the $154,000 in preferred stock turn in their certificates in exchange for common stock, and that an additional $100,000 in 7 per cent. preferred stock be issued. The members of the committee agree to take $50,000 worth of the new preferred stock, providing the whole amount be raised. The proposed preferred stock would carry a bonus of 50 per cent. in common stock.

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Wagenhals Plans Stock Increase

DETROIT, MICH., March 15—The Wagenhals Motor Car Co. is planning a capital stock increase from $100,000 to $500,000 within the next week or 10 days. With the coming of the parcels post, which has been very favorable to the tri-car types of delivery machines, such as the Wagenhals, the concern's activities have been greatly increased and orders have been placed by it for parts for 500 of the three-wheelers, according to W. G. Wagenhals.

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U. S. Truck Bids for April 15

WASHINGTON, D. C., March 18—*Special Telegram*—Sealed proposals for furnishing the United States government with a number of motor trucks have been issued by the General Supply Committee. The bids will be opened in this city April 15. The bids call for one electric motor mail wagon of 1,000 pounds capacity, one gasoline motor wagon of 1,000 pounds capacity, four electric trucks of 2,000 pounds capacity, four gasoline motor trucks of 2,000 pounds capacity, one electric truck of 3,000 pounds capacity and one gasoline truck of 3,000 pounds capacity. Manufacturers desiring to put in bids should make application to the General Supply Committee for specifications and blank forms. Successful bidders will likely be called upon to furnish more trucks than the schedule now calls for.

Shipment Book Completed by N.A.A.M.

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Is a Ready Reference To Facilitate Return of Automobile Freight Car Equipment To Detroit Factory Rails

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DETROIT, MICH., March 11—Continuing its work of furthering the shipments of automobiles from Detroit and other cities, the Traffic Department of the National Association of Automobile Manufacturers has just completed the compilation of a booklet containing a list of all the automobile freight car equipment of all railroads. This booklet, which is intended as a ready reference to facilitate the return of this equipment to the home rails and to automobile manufacturing territory, is being sent to all railroad officials and to automobile makers as well.

As the automobile industry is dependent for its shipping facilities on the freight cars listed in the booklet, the co-operation of all railroad officials and employees in the prompt and proper handling of these cars is urgently requested in a letter which accompanies the list and which reads as follows:

"To railroad officers:

"It is well known that automobile factories cannot use ordinary box cars because the doors in such cars are too small.

"We are inclosing a pamphlet which shows cars which have doors of special sizes and construction for handling automobiles, and it is on these cars and the efficient handling of same that the automobile industry must depend for its transportation.

"This automobile equipment has an important duty to perform. It must handle annually more than 100,000 carloads of automobiles valued at something like $300,000,000.

"We appreciate the effort made by railroads to handle this situation. Nevertheless, it is apparent that the importance of prompt and proper handling of automobile equipment is not fully appreciated by many under whose jurisdiction these cars come. Location statements of automobile equipment show such a scattered condition of these cars that we are forced to the belief that automobile equipment is counted and figured as part of the general car balance, in other words, as so many box cars. An examination of car records indicates that many of these automobile cars, after being relieved of a factory load in the West or South, are used as ordinary box cars, and either retained in local service or reloaded and routed at variance with railway rules and without regard to the requirements of the automobile industry. There are a great many such 'tramp' automobile cars scattered through the West and South today.

"The shipping of automobiles from factories is now at its height and for the next few months will approximate 10,000 carloads per month.

"Unless there is steady movement of automobile equipment back into manufacturing territory the railroads serving the shipping points will be unable to meet the demand.

"Therefore we appeal to Western and Southern railroads to recognize this condition, and to check their records for these automobile cars, sending home any that you find on your rails. And we urge Eastern railroads to issue renewed and positive instructions that will insure control of all automobile equipment coming to your rails from now on for use in automobile traffic. National Association of Automobile Manufacturers, Inc. J. S. Marvin, General Traffic Manager."

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Case Company Shows Gain

RACINE, WIS., March 17—The annual report of the J. I. Case T. M. Co., Racine, Wis., shows a splendid increase in the automobile department for 1912 as compared with 1911. The general income account of the big concern is as follows:

	1912.	1911.
Gross sales	$14,854,945	$9,163,749
Operating expenses	12,084,172	7,654,559
Net income	2,770,773	1,509,191
Charges	606,338	448,240
Surplus and dividend	2,264,485	1,060,951

Gross sales in all departments show an increase of 60 per cent. and the increase in net income is approximately 50 per cent. The amount available for dividends on the $12,000,000 preferred, 7 per cent. cumulative, outstanding was 2.7 times the amount required, leaving a surplus of 18 per cent. available for the common stock.

Of the gross sales of $14,026,633.93 in 1913, the domestic sales aggregated $9,841,782 and the export sales $4,184,851.93.

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The Schildwachter Carriage Co., New York City, has filed a voluntary petition in bankruptcy. The assets of the company are $23,583 and its liabilities $36,486.

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Opportunities are being given at this auction to prospective buyers to examine the various parcels of goods in advance so that the auctioneer refers to each parcel by his catalog number when put up for sale.

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Petition Filed Against Bergdoll

PHILADELPHIA, PA., March 17—Three creditors of the Louis J. Bergdoll Motor Co., of this city, instituted proceedings today in the United States District Court to have the motor car company adjudged an involuntary bankrupt.

The creditors who petitioned the court and their claims are: W. C. Rhodes, Inc., $1,696.85; Chilton Co., $505, and the Castle Lamp Co., $1,772.85. It is alleged that during the past 30 days preferential payments amounting in the aggregate to over $33,000 have been made by the automobile company as follows: to Erwin R. Bergdoll, $31,200; C. A. Bergdoll Coal Co., $400, and the North Broad Street Realty Co., $1,500.

An official of the Bergdoll company declared this afternoon that if the proceedings did not interrupt the marketing of the company's output it would continue solvent.

Judgment for Willys-Overland

BUFFALO, N. Y., March 19—(*Special Telegram*)—The Willys-Overland Co., Toledo, O., was awarded a judgment of $5,895.83 against Gustave R. Poppenberg, Buffalo, in a decision filed with the county clerk at Buffalo Tuesday by Clark H. Timerman, referee. The papers filed claim Mr. Poppenberg in 1909, and 1911, was agent in Buffalo for Overland cars. Contract expired in 1910, but Poppenberg was unable to ascertain whether he was to have new contract and consequently in August, 1910, Mr. Poppenberg bought Overland cars amounting to $19,630. But when time came to renew contract Ohio manufacturers refused to grant renewal. Poppenberg demanded settlement of account under previous contract claiming rebates and damages for sales in his territory and other items. Willys-Overland company then sued to recover purchase price of automobiles bought by Poppenberg. Purchase price of cars amounted with interest to $22,675.83, which amount was undisputed by the Poppenberg concern. Timerman, as referee, awarded Mr. Poppenberg in his counter claims $16,780, Willys-Overland Co. securing balance.

Auto-Ette Announces Cyclecar

CHICAGO, March 15—The Auto-Ette Co., Chrisman, Ill., is announcing a light car for $368, which, although of small-car size and of standard tread, is built along cyclecar lines. It has a 96-

inch wheelbase and a 56-inch tread, but uses 26-inch motorcycle wheels and motorcycle tires.

The motor is a De Luxe twin motorcycle motor made by the Spacke Machine Co., Indianapolis, and is rated at 9 horsepower. This is air-cooled and with the two cylinders set at an angle. The engine shaft chain-drive connects to a countershaft with an epicyclic gear in connection, giving two speeds and reverse. From the countershaft the drive is taken by two 28-degree motorcycle belts, thus doing away with differential and tending toward great simplicity. The weight is given as 400 pounds and the speed at from 2 to 50 miles per hour. The Auto-Ette company is planning on 1,000 cars for this year.

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The Niagara Motors Mfg. Co., which recently moved its plant from Buffalo, N. Y., to Dunkirk, N. Y., turned out its first machine from the new factory Saturday, when shipment was made to New Orleans. The company now employs twenty-five men, new machinery is being installed and the average output weekly from the start will be five automobiles.

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G. R. Truck Co. Needs Money

GRAND RAPIDS, MICH., March 17—A committee comprising E. Alfred Clements, L. A. Cornelius, M. Kirsch, Frank T. Hulswit and William F. McKnight has issued a statement to stockholders of the Grand Rapids Motor Truck Co. setting forth the need of additional capital and proposing that the holders of the $154,000 in preferred stock turn in their certificates in exchange for common stock, and that an additional $100,000 in 7 per cent. preferred stock be issued. The members of the committee agree to take $50,000 worth of the new preferred stock, providing the whole amount be raised. The proposed preferred stock would carry a bonus of 50 per cent. in common stock.

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Wagenhals Plans Stock Increase

DETROIT, MICH., March 15—The Wagenhals Motor Car Co. is planning a capital stock increase from $100,000 to $500,000 within the next week or 10 days. With the coming of the parcels post, which has been very favorable to the tri-car types of delivery machines, such as the Wagenhals, the concern's activities have been greatly increased and orders have been placed by it for parts for 500 of the three-wheelers, according to W. G. Wagenhals.

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U. S. Truck Bids for April 15

WASHINGTON, D. C., March 18—*Special Telegram*—Sealed proposals for furnishing the United States government with a number of motor trucks have been issued by the General Supply Committee. The bids will be opened in this city April 15. The bids call for one electric motor mail wagon of 1,000 pounds capacity, one gasoline motor wagon of 1,000 pounds capacity, four electric trucks of 2,000 pounds capacity, four gasoline motor trucks of 2,000 pounds capacity, one electric truck of 3,000 pounds capacity and one gasoline truck of 3,000 pounds capacity. Manufacturers desiring to put in bids should make application to the General Supply Committee for specifications and blank forms. Successful bidders will likely be called upon to furnish more trucks than the schedule now calls for.

Shipment Book Completed by N.A.A.M.

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Is a Ready Reference To Facilitate Return of Automobile Freight Car Equipment To Detroit Factory Rails

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DETROIT, MICH., March 11—Continuing its work of furthering the shipments of automobiles from Detroit and other cities, the Traffic Department of the National Association of Automobile Manufacturers has just completed the compilation of a booklet containing a list of all the automobile freight car equipment of all railroads. This booklet, which is intended as a ready reference to facilitate the return of this equipment to the home rails and to automobile manufacturing territory, is being sent to all railroad officials and to automobile makers as well.

As the automobile industry is dependent for its shipping facilities on the freight cars listed in the booklet, the co-operation of all railroad officials and employees in the prompt and proper handling of these cars is urgently requested in a letter which accompanies the list and which reads as follows:

"To railroad officers:

"It is well known that automobile factories cannot use ordinary box cars because the doors in such cars are too small.

"We are inclosing a pamphlet which shows cars which have doors of special sizes and construction for handling automobiles, and it is on these cars and the efficient handling of same that the automobile industry must depend for its transportation.

"This automobile equipment has an important duty to perform. It must handle annually more than 100,000 carloads of automobiles valued at something like $300,000,000.

"We appreciate the effort made by railroads to handle this situation. Nevertheless, it is apparent that the importance of prompt and proper handling of automobile equipment is not fully appreciated by many under whose jurisdiction these cars come. Location statements of automobile equipment show such a scattered condition of these cars that we are forced to the belief that automobile equipment is counted and figured as part of the general car balance, in other words, as so many box cars. An examination of car records indicates that many of these automobile cars, after being relieved of a factory load in the West or South, are used as ordinary box cars, and either retained in local service or reloaded and routed at variance with railway rules and without regard to the requirements of the automobile industry. There are a great many such 'tramp' automobile cars scattered through the West and South today.

"The shipping of automobiles from factories is now at its height and for the next few months will approximate 10,000 carloads per month.

"Unless there is steady movement of automobile equipment back into manufacturing territory the railroads serving the shipping points will be unable to meet the demand.

"Therefore we appeal to Western and Southern railroads to recognize this condition, and to check their records for these automobile cars, sending home any that you find on your rails. And we urge Eastern railroads to issue renewed and positive instructions that will insure control of all automobile equipment coming to your rails from now on for use in automobile traffic. National Association of Automobile Manufacturers, Inc. J. S. Marvin, General Traffic Manager."

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Case Company Shows Gain

RACINE, WIS., March 17—The annual report of the J. I. Case T. M. Co., Racine, Wis., shows a splendid increase in the automobile department for 1912 as compared with 1911. The general income account of the big concern is as follows:

	1912.	1911.
Gross sales	$14,854,945	$9,163,749
Operating expenses	12,084,172	7,654,559
Net income	2,770,773	1,509,191
Charges	606,338	448,240
Surplus and dividend	2,264,485	1,060,951

Gross sales in all departments show an increase of 60 per cent. and the increase in net income is approximately 50 per cent. The amount available for dividends on the $12,000,000 preferred, 7 per cent. cumulative, outstanding was 2.7 times the amount required, leaving a surplus of 18 per cent. available for the common stock.

Of the gross sales of $14,026,633.93 in 1913, the domestic sales aggregated $9,841,782 and the export sales $4,184,851.93.

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The Schildwachter Carriage Co., New York City, has filed a voluntary petition in bankruptcy. The assets of the company are $23,583 and its liabilities $36,486.

Associations Are United

Automobile Chamber of Commerce, Inc., Is Formed by Merger of the N. A. A. M. and A. B. of T.

New Corporation to Continue Present Work of the Parent Organizations—Has Over 100 Members

NEW YORK CITY, March 19—The Automobile Chamber of Commerce, Inc., was organized here today by a formal merger of the former National Association of Automobile Manufacturers and the Automobile Board of Trade. The purposes of the new body are to advance each and every interest of the automobile industry and its members, to work for the enactment and enforcement of beneficial laws and to promote harmony among the members of the industry; finally to "acquire by grant, gift, purchase, devise or bequest, to hold and to dispose of such property as the purposes of the corporation shall require, subject to such limitations as may be prescribed by law, including inventions, letters patent and processes, or rights thereunder, for the benefit of its members and not for pecuniary profit."

The officers of the corporation are: Charles Clifton, president; W. C. Leland, vice-president; Col. George Pope, treasurer; R. D. Chapin, secretary. The board of directors is composed of the following: Charles Clifton, Charles C. Hanch, Hugh Chalmers, Sydney Waldon, Samuel T. Davis, W. C. Leland, Windsor T. White, William E. Metzger, H. O. Smith, Albert L. Pope, L. H. Kittredge, R. D. Chapin, G. W. Bennett and H. H. Rice.

In a general way, the work of the new corporation will be along the same lines as that of its parent bodies. There is a possibility, however, that new kinds of work will be taken on. As for the arrangement of Dyer licenses for the members, who number 100, this will be settled in the near future.

Akron Situation Is Quiet

AKRON, O., March 18—The situation in the rubber workers' strike here has been exceedingly quiet during the past 3 or 4 days. The manufacturers say that more men are constantly returning to work. The Goodyear plant is now working day and night and the Goodrich-Diamond and Firestone plants are about to put on night shifts.

AKRON, O., March 19—(*Special Telegram*)—D. M. Goodrich was elected director of the B. F. Goodrich Co., in place of W. B. Miller at annual meeting last week. No election was made to fill place of W. B. Miller, who resigned, as vice-president.

Automobile Union Formed

MILWAUKEE, WIS., March 17—A new federation of union workmen, membership in which will be confined to employees of automobile and parts factories, has been organized at Milwaukee as the result of the Smith and Milwaukee Motor Co. strikes. The title is United Metal Mechanics' Union, auxiliary of Milwaukee Lodge No. 66, International Association of Machinists.

Have Operating Plan for Columbus

COLUMBUS, O., March 17—Proposal that the Columbus Buggy Co., which recently went into the hands of a receiver be taken over by the creditors and operated until all of the uncompleted product on hand can be finished and sold, is made in the report of the committee of creditors named on February 13, to investigate the status of the company and make recommendations as to the best method of procedure. The committee is composed of George W. Bright, E. R. Sharp, George W. Lattimer, T. C. Dunlap, B. G. Watson and D. N. Postelwaite.

The committee says that it believes if the business of the company is revived and continued under proper management, the creditors' claims might be paid eventually almost in full. On the other hand, the committee thinks, if the business were to be disposed of in the usual course of a receiver's sale, without the co-operation of creditors, the percentage paid to the creditors would be very uncertain.

DETROIT, MICH., March 15—W. M. Anthony, comptroller of the Maxwell Motor Co., Inc., has moved the executive offices of the concern all to Detroit, the accountants and others connected with this department all coming to this city last week. The general offices at Woodward and Warren avenues are now in full swing and here will be handled all of the business of the $37,000,000 concern.

MILWAUKEE, WIS.—At the annual meeting of the Sternberg Mfg. Co., of Milwaukee, manufacturing commercial vehicles, all of the officers were re-elected as follows: President, William Sternberg; vice-president, E. M. Sternberg; secretary, Victor L. Brown; treasurer, Robert L. Hayssen. Mr. Brown was also continued as general manager.

NEW YORK CITY, March 19—The midsummer meeting of the Society of Automobile Engineers will be held on the steamer City of Detroit on Lake Michigan on June 5, 6 and 7. The

Automobile Securities Quotations

Despite the fact that the Akron situation is apparently improving constantly, the market was rather unstable this week, and it was especially in rubber and tire stock issues that a downward trend was in evidence. Goodyear common led in this respect, with a drop of 40 points as against last week's closing figure; Firestone common lost 22, Goodrich common 12, Miller 10 and Swinehart 7. The other stocks, as a consequence, were also weak.

	1912		1913	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	..	..	150	165
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, pfd	..	..	97	101
American Locomotive, Co., com	36	37	35½	36
American Locomotive Co., pfd	106	107	104	106
Chalmers Motor Company, com	..	..	115	125
Chalmers Motor Company, pfd	..	..	100	102
Consolidated Rubber Tire Co., com	12	20	15	20
Consolidated Rubber Tire Co., pfd	30	40	..	79
Firestone Tire & Rubber Co., com	200	205	270	280
Firestone Tire & Rubber Co., pfd	107½	110	104	107
Fisk Rubber Co., com	..	..	..	..
Fisk Rubber Co., pfd	..	..	..	102½
Garford Company, preferred	..	..	95	100
General Motors Company, com	31	32	29	31¼
General Motors Company, pfd	78	78½	76	78
B. F. Goodrich Company, com	..	..	27½	28½
B. F. Goodrich Company, pfd	..	..	93	97½
Goodyear Tire & Rubber Co., com	338	342	345	355
Goodyear Tire & Rubber Co., pfd	108	110	101½	103
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	5	10
International Motor Co., pfd	..	..	35	45
Lozier Motor Company	..	..	..	25
Miller Rubber Company	..	..	175	185
Packard Motor Company	104	107	100	103
Peerless Motor Company	..	..	115	125
Pope Manufacturing Co., com	40	42	20	22
Pope Manufacturing Co., pfd	73	76	..	65
Reo Motor Truck Company	8	10	11½	12½
Reo Motor Car Company	23	25	20	21½
Rubber Goods Mfg. Co., pfd	100	105	103	106
Studebaker Company, com	..	..	29	30
Studebaker Company, pfd	..	..	86½	90
Swinehart Tire Company	..	..	88	95
U. S. Motor Co., com	..	..	..	8
U. S. Motor Co., 1st pfd	..	..	..	33
U. S. Motor Co., 2nd pfd	..	..	..	65
U. S. Rubber Co., com	50¼	51	59½	60½
U. S. Rubber Co., 1st pfd	111½	112½	104½	105½
White Company, preferred	..	..	103	108
Willys-Overland Co., com	..	..	62	64
Willys-Overland Co., pfd	..	..	92	97

details of the program for this meeting have not been settled upon as yet. It is known, however, that a number of members of the Institution of Automobile Engineers and the Society of Motor Manufacturers of England will be guests of the S. A. E. at the time of the midsummer meeting. The itinerary program of the English Society follows:

Wednesday, May 17—Leave Tilbury by the SS. *Minnewaska.*
Monday, May 26—Arrive New York.
Monday and Tuesday, May 26 and 27—In New York.
Wednesday, May 28—Leave New York for Pittsburg.
Thursday, May 29—In Pittsburg.
Friday and Saturday, May 30 and 31—In Indianapolis.
Sunday, Monday, Tuesday and Wednesday, June 1, 2, 3 and 4—In Detroit.
Thursday, Friday and Saturday, June 5, 6 and 7—Lake trip on steamer (S. A. E. Summer Meeting).
Sunday and Monday, June 8 and 9—In Cleveland.
Tuesday, June 10—In Buffalo. Here the party will be divided, and those who wish may return direct to New York. The remainder will proceed to Providence.
Wednesday, June 11—In Providence.
Thursday, June 12—In Bridgeport and New Haven.
Friday, June 13—In Hartford.

Among the works and factories which it is the intention of the party to visit are the Cole, Henderson, Marion, Marmon, National, Stutz, and Waverley at Indianapolis; the Cadillac, Ford, Chalmers, Hudson, Packard, and Timken Axle at Detroit; the Peerless, Winton and Stearns at Cleveland and the Pierce-Arrow at Buffalo.

As the program notifies that ladies are specially invited it would seem that the customary excursions are to form a part of the approaching visit.

Members of the party who continue the trip to Providence will visit Brown & Sharpe Works there, and later the Locomobile factory at Bridgeport. Some carriage works at New Haven and various tool and other factories at Hartford will also be inspected.

Market Changes of the Week

Tin proved again to be the most important change in the markets. A loss of $2.65 occurred, though higher opening cables from London had the effect of renewed interest in the local market, prices advancing under the influence of the better cables. This lack of interest has been the cause of the recent slump. While the market for refined copper is very quiet and actual business of small dimensions, stock for early shipment is under pretty good control, and for prompt delivery from $.14 7-8 to $.15 a pound for electrolytic and Lake copper. The lead market is quiet. A fair volume of sales is reported. Lead fluctuated throughout the last week and ended on Tuesday with a gain of $.05. There was an absence of new developments of importance in the linseed oil situation, as there were no changes in prices. Both petroleums from the Pennsylvania and Kansas wells remained constant and firm. Automobile scrap remained constant at $.09 7-8.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.....	.08¼	.07⅝	.07¾	.07¾	.07⅝	.07⅝	— .00⅜
Beams & Channels, per 100 lbs.....	1.61	1.61	1.61	1.61	1.61	1.61	.....
Bessemer Steel, ton	29.00	29.00	29.00	29.00	29.00	29.00	.....
Copper, Elec., lb...	.14⅞	.14⅞	.14⅞	.14⅞	.14⅞	.14⅞	.....
Copper, Lake, lb...	.14⅞	.14⅞	.14⅞	.14⅞	.14⅞	.14⅞	.....
Cottonseed Oil, bbl.	6.38	6.37	6.38	6.38	6.32	6.35	— .03
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	.....
Fish Oil, Menhaden, Brown..	.33	.33	.33	.33	.33	.33	.....
Gasoline, Auto, 200 gals.....	.22¼	.22¼	.22¼	.22¼	.22¼	.22¼	.....
Lard Oil, prime...	.90	.90	.90	.90	.90	.90	.....
Lead, 100 lb.....	4.30	4.20	4.20	4.35	4.35	4.35	+ .05
Linseed Oil.....	.47	.47	.47	.47	.47	.47	.....
Open-Hearth, Steel, ton.....	29.00	29.00	29.00	29.00	29.00	29.00	.....
Petroleum, bbl., Kansas crude...	.88	.88	.88	¼ .88	.88	.88	.....
Petroleum, bbl., Pa. crude	2.50	2.50	2.50	2.50	2.50	2.50	.....
Rapeseed Oil, refined	¼ .68	.68	.68	.68	.68	.68	.....
Silk, raw Italy....	....	4.30	....	....	4.30	4.35	+ .05
Silk, raw Japan...	....	3.70	....	....	3.70	3.72½	+ .02½
Sulphuric Acid, 60 Beaumé	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.....	48.35	45.88	47.25	47.25	45.70	45.70	—2.65
Tire Scrap.....	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	.....

New Fuel For London

Shell II Has Specific Gravity of .728 to .735 and Sells for 38 Cents Per Gallon

Benzol Seems a Way Out of Fuel Difficulty—Petroleum Discovered in Large Quantities in Papua

LONDON, March 5—The price of gasoline has again been raised, and the proprietors of Shell announce that in order to meet the enormous demand, a new grade of gasoline is to be put on the market. This new fuel will be known as Shell 11. It has a specific gravity of .728 to .735 and it will sell at 38 cents per gallon, while the ordinary gasoline, packed in the red cans, with a specific gravity of .713 to .720 will be sold at 42 cents per gallon, which is 2 cents per gallon in excess of that paid last week. Pratt's spirit has not been advanced and still sells at 38 cents per gallon, with Taxibus only 36 cents per gallon. Carless, Capel & Leonard have raised their Standard gasoline up to 44 cents per gallon, Movril at 42 cents, and Car-bus at 36 cents per gallon.

As has repeatedly been pointed out, the only way out of the fuel difficulty is to use an alernative fuel, preferably benzol.

LONDON, March 8—In view of the present fuel crisis, the official report received by the Australian Commonwealth authorities that a new source of petroleum supply has been discovered in Papua (or British New Guinea), is of much interest. Investigations made so far disclose the existence of gas springs and oil seepage over an area of 900 square miles. An examination of surface evidence and general geological conditions is now being made, but no applications of oil leases have been granted by the administrator while the field is being fully tested by boring.

Batavia Sues Seamless Tires

NEW YORK CITY, March 19—After having advised various tire-manufacturing companies of the alleged illegality of making casings the treads of which resemble the Batavia non-skid type, the Batavia Rubber Co., of Batavia, N. Y., has brought suit in the U. S. District Court, Southern District of New York, against the New York branch of the Seamless Rubber Co., New Haven, Conn. The claim of the bill of complaint, filed for the plaintiff by Holmes, Rogers & Carpenter of New York, is that by making a tread stated to be an exact copy of the Batavia type, the Seamless company exerted unfair competition. The Batavia company demands a perpetual injunction against the Seamless Rubber Co., to prevent it from making treads which, according to plaintiff's claims, were in several cases mistaken by buyers for Batavia treads, and it also calls for accounting of the business done in such treads in the past.

BUFFALO, N. Y., March 19—*Special Telegram*—An injunction was issued through United States District Court by Chief Justice White on Tuesday in case of Lovell-McConnell Mfg. Co., Hutchison Electric Horn Co. and Miller Reese Hutchison against International vs. Automobile League of Buffalo ordering the defendants, their officers, agents and attorneys to refrain from advertising, circulating or offering deduction, discount or rebate from prices designated by complainants at which the automobile horns made by the latter must be sold to the public as shown by tags during pendency of this action. The injunction is the continuation of a preliminary order handed down when the appeal was granted to the complainants in the Circuit Court on refusal of the court to grant certain injunctions.

Fight Bad New York Bills

Hearing To Be Given Automobilists and Makers on Tire-Dating Measure Thursday—Owners, Dealers and Manufacturers Unite in Pilgrimage to Albany To Kill Unjust Bills

NEW YORK CITY, March 19—One of the most striking of the examples of ignorant and pernicious legislation which the automobilists, dealers and manufacturers of the country have been called upon to combat in the Empire State is the tire-dating bill which was resurrected last week by the Hon. Christy Sullivan. Representatives of the tire companies and many automobilists and dealers hastened to Albany at once to protest against its passage, but they were refused a hearing and the measure was rushed through for some reason not apparent.

This is practically the same bill that was brought up last year and on which a hearing was given March 19. It was later amended and finally dropped out of sight. It appears now as an amendment to Section 394-A of the laws of 1909 and provides that:

"Motor vehicle tires are to be dated. No person or corporation shall manufacture, sell, offer or expose for sale in this state a tire for use on a motor vehicle unless the date when such tire was manufactured shall be impressed or branded upon the material of which such tire is constructed, or otherwise indicated by label securely attached thereto."

The act also provides a penalty of $50 for violation of its provisions.

Representatives of the tire manufacturers, dealers and car owners have called Governor Sulzer's attention to the pernicious character of the measure and will be given a hearing on Thursday before the Senate Committee on Miscellaneous Corporations at Albany. The bill must have the Governor's signature, of course, before it will become a law.

The worst feature of the situation is that the bill will be of benefit to no one, except, perhaps, the unscrupulous dealers against whom it is ostensibly aimed. For it would be an easy matter to fool the public with a dated tag, which could be readily changed to suit the occasion, as to the real age of a tire.

Moreover, the manufacturers' guarantee obviates the necessity for such legislation. The tire-dating feature would be the cause of hardship to the tire makers because the public, misled as to the true facts of the case by the provisions of the bill, would demand brand new tires continually. The result would be that when winter came and trade was dull the makers would have to close down their plants as no one would buy last fall's tires in the spring and when spring came there would be no possibility of supplying the tremendous demand for new tires. This is one reason the bill would make things bad for the consumer.

But to come to the fact which renders the whole measure ridiculous to the veriest tyro, automobile tires kept in the proper way are better 6 months after they leave the factory than new.

Years ago when the industry was new there was some excuse for the seeming childlike ignorance of our would-be legislators, but nowadays, when nearly all of them have cars themselves, it is not only an insult to their own understandings to promote such measures as the tire-dating bill, but an aspersion on their motives.

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Correction—In THE AUTOMOBILE for March 6 the cylinder dimensions of the new six-cylinder Columbia car were given as 4.5 by 4.5 inches. The stroke of this motor will be 5.5 inches.

ALBANY, N. Y., March 13—Over sixty motor clubs of this state and representatives of dealers from New York and other cities were present here today for the hearing before the committee on internal affairs on the new motoring legislation, the delegates filling the assembly chamber which was used for the hearing. Never before has motoring New York presented such a united phalanx and never before have legislators realized the determination of motorists to have fair play in legislation. As a result of the hearing it is generally conceded that nearly all of the bills will be allowed to die in committee and that practically the Callan law of today will continue. President A. J. Deer, of the New York State Automobile Association, had charge of the delegates for the hearing. Melvin P. Bender, counsel for the organization, opened the hearing and was followed by Charles Thaddeus Terry, counsel for the dealers. Many others spoke. The new legislation aimed at was that doubling present registration fees and increasing them three- and five-fold in trucks; and that giving the secretary of state power to revoke licenses at will with hearings or not as desired. The bills arranging for owners and chauffeurs to have to give bonds before being registered were also the center of attack. Three years ago when the Callan bill was made the law of this state, the motorists only consented to a registration charge to defray the cost of identification and secure a rational operating law. It was practically a gentleman's agreement on the ground, and now when the government aims at doubling the fees without any reason other than getting more revenue it is looked upon as a breach of faith by the motorists. They threw the gauntlet down publicly, declaring that if fees are raised the constitutionality of the present registration law will be carried to the highest courts and in the meantime all registrations will be paid under protest.

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Ohio Bill for Sliding Scale

COLUMBUS, O., March 17—Representative M. A. Warnes, of Holmes County, has introduced a bill in the Ohio General Assembly providing for a sliding scale in assessing fees for the registration of automobiles in Ohio. The bill supersedes the one which was introduced in the Legislature at an earlier date, but was withdrawn because it was believed to be unconstitutional. Fees ranging from $5 to $25 are proposed for the various horsepowered cars, while motorcycles are assessed $3 each.

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New License Law for Indiana

INDIANAPOLIS, IND., March 17—The Indiana Legislature has passed a law requiring an annual state automobile license, which has been approved by Governor Ralston, and will become effective May 1. Heretofore it has been necessary only to pay the state a registration fee of $1, which did not have to be renewed. The new law forbids any municipality from exacting a license fee and this will mean a loss of $30,000 a year to the city of Indianapolis alone.

Under the new law the state license will be as follows: Motorcycles, $3; motor trucks, regardless of horsepower, $5; electric

cars, $5; pleasure cars, 15 horsepower and under, $5; 15 to 25 horsepower, $7.50; 25 to 35 horsepower, $12.50; 35 to 50 horsepower, $15; and over 50 horsepower, $20. The purchaser is to be allowed to operate under the license number of the dealer for 15 days after buying a car or motorcycle.

The numerals on the number plate are to be 4 inches high and the color is to be changed each year. Manufacturers and dealers are to pay a license of $15 a year and may obtain as many duplicate number plates as may be required at $1 each. Automobile owners from other states, complying with the motor license regulations of their own states, need not pay an Indiana license, provided their own states grant similar reciprocity.

There is also a provision for the licensing of chauffeurs, requiring an examination by examiners to be appointed by the secretary of state. The annual license fee is to be $5. The legal speed is fixed at 10, 15, 20 and 25 miles an hour, graduated according to the manner in which each district is built up.

The revenue under the act is to be placed in a road fund and prorated among the counties of the state. Upon a second conviction of the act a chauffeur's license may be revoked three months and upon a third conviction for 6 months, to which not exceeding 60 days' imprisonment may be added.

There is also a new law in Indiana making it a misdemeanor for any person to take or use a motor car without the owner's consent.

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Ohio Might Tax Automobiles

FINDLAY, O., March 15—A bill has just been introduced in the legislature providing for automobile fees to be materially raised, as follows: Electrics, $5; gasoline cars under 20 horsepower, $5; from 20 to 30 horsepower, $10; from 30 to 40 horsepower, $15; from 40 to 50 horsepower, $20; and over 50 horsepower, $25; manufacturers' and dealers' licenses, $25; copies of licenses, certificates, $25 each.

The proceeds of the licenses, less the cost of operating the department, are to be paid in to the state treasury for the improvement and repair of the roads of the state.

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Idaho Has Good Road Laws

BOISE, IDAHO, March 8—On the very last day of the legislative session the Senate passed the Koelsch and Shattuck bills, both good roads measures.

The Koelsch bill provides for the creation of a state highway commission; a special tax on motor vehicles, and for convict labor on the highways. The highway commissioners will receive no pay except necessary expenses and the commission will have entire jurisdiction over the highways of the state.

A special tax is assessed on automobiles as follows: Under 30 horsepower, $20; 31 to 40 horsepower, inclusive, $25; 41 to 50 horsepower inclusive, $30; above 50 horsepower, $40. All moneys raised from this tax and from registrations and fines will go into the road fund and will be used for no other purpose.

The Shattuck bill provides for the issuance of $200,000 state bonds, the money to be used in laying out, surveying and constructing a system of state highways.

A senate joint memorial was introduced by Mr. Hart, rquesting Congress to transfer 50,000 acres of timbered land now held within the National forests by the United States within the boundaries of Idaho for the purpose of creating a fund to be used by the state for the establishment and maintenance in good repair of a system of public roads within the borders of the state.

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Bad Roads Cost Third of Crops

WASHINGTON, D. C., March 16—According to a statement issued by the federal department of agriculture, an improvement in the distribution of one-third of the crops of the farms of the country would be effected through the construction of a better system of public highways in the United States. This would eliminate much of the nation's waste and effect a saving of many millions of dollars, it is declared.

As a result of investigation of the economic value of improved roads, it has been found that on the basis of a $9,000,000,000 crop, which was harvested last year, at least one-third remained on the farm. The consumer paid about $13,000,000,000 for $6,000,000,000 worth of products sold by the farmers, the latter receiving only 46 per cent. of what the consumer paid.

On the basis of these figures Logan Waller Page, director of the office of public roads, has declared that if the roads of the country were put into better shape and properly maintained it would be possible for farmers to get to shipping points at all seasons of the year and dispose of this one-third crop, which now goes to waste. The good roads would soon pay for themselves, Director Page declares, with corresponding improved conditions for all time.

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Texas To Have Highway Department

AUSTIN, TEX., March 14—Prospects are favorable for the enactment by the state legislature of Texas of a bill creating a state highway department and establishing a state highway commission and the office of state highway engineer. The measure, of which Senators H. B. Terrell and H. L. Darwin are the authors, has been favorably reported by the committee on roads, bridges and ferries. It carries an appropriation of $10,000 to pay the general running expenses of the proposed department up to and including January 31, 1914. The funds for maintaining the department are to be provided for by taxing each motorcycle $2 per annum and each motor vehicle of other description $5 per annum.

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SEATTLE, WASH., March 14—A new measure regulating the use of motor car signals went into effect in this city today, and covers the use of signals on motor cars and fire department vehicles. According to the new regulations the signal used must be capable of producing an abrupt sound sufficiently loud to be heard above the noise of traffic and to serve as an adequate warning of the approach of such motor cars, motorcycles or other vehicles, and of the danger to any person caused thereby. The law further stipulates that it is unlawful for persons driving motor vehicles other than fire department wagons, police department vehicles, and health and sanitation department vehicles to sound the signal more than three short, abrupt blasts in succession.

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MILWAUKEE, WIS., March 14—The latest freak among Wisconsin motorists are facing at the hands of the Wisconsin Legislature is the Richardson bill, which attempts to make certain that no motorist will exceed the speed limit by requiring all motor cars sold in Wisconsin to be so geared that the maximum speed to be obtained from any car will not be more than 25 miles per hour.

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Benjamin Takes Alco Sales

NEW YORK CITY, March 19—C. Arthur Benjamin has taken over the office of general sales manager of the automobile department of the American Locomotive Co., his headquarters being in this city. Before taking the place of Harry S. Houpt, who left the Alco company a short while ago, Mr. Benjamin was engaged in the automobile business in Syracuse, where he handled Packard and Hudson cars.

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NEW YORK CITY, March 17—John Calder, formerly associate general manager of the Cadillac Motor Car Co., has just accepted the appointment of acting vice-president of the International Motor Co., manufacturer of Mack, Sauer and Hewitt trucks.

Paris Show Date Changed To October

Proposed To Reduce Present Slack Season Between Active Selling and Announcement of New Models

This Change Will Probably Be Accompanied by a Shortening of From 19 or 20 Days to 10

PARIS, March 8—Paris will open the European show season with its exhibition in the Grand Palais during the month of October. This change from December to October was proposed in order to reduce the present slack season between the end of the active selling period and the placing on the market of the following season's models. It is believed that by making this change at least 2 months will be gained to the French trade, for work on the 1914 models will be begun about July, instead of being held back until September, as at present. Recently the whole of the French trade has been consulted on this matter, with the result that a unanimous decision has been arrived at in favor of the early show. No official announcement has yet been made on the date of the Paris exhibition, but in view of the favorable opinion expressed by the six individual trade associations responsible for this event, the adoption of the early date cannot be doubted. There appears to be but one difficulty in the way, and this can doubtless be removed. A society of artists has an option on a portion of the Grand Palais for an art exhibition during the month of October. In view of the enormously greater importance of the automobile show, a request will be made to the artists either to change their date or find another hall, and it is not supposed that this request will be refused. Already the aeroplane manufacturers, who usually have their show in the Grand Palais in October, have agreed to change the date in order to give the automobile manufacturers a preference. With a show in the Grand Palais in October, Paris will have the first exhibition in Europe, coming before London, which has had the advantage in this respect up to the present. It is declared by the French manufacturers that the change of date has not been made in order to gain an advantage over London, but entirely in view of economic home conditions. Nevertheless, it is felt in England that Paris will secure an enormous commercial advantage by being able to have the first display of the new season's models. The date of the London show has not yet been fixed, but it will probably be held in November.

The change in the date of the Paris show will doubtless be accompanied by a change in the duration of the show. Up to the present the Paris Salon has lasted from 19 to 22 days, being open both on weekdays and Sundays. It is now proposed to reduce the period to 10 days, the show opening on a Friday or Saturday and closing on the following Sunday or Monday week. This will give 10 clear days, including two Sundays. This change is proposed by members of the trade who find that a 22-day show causes considerable inconvenience to the commercial staffs. If the short show is adopted, the exhibition will probably be kept open until 7 or 8 o'clock in the evening, instead of closing at 6, as at present. It will also be necessary to diminish, if not entirely abolish, the free passes now granted. It is believed that the total attendance will be just as great with only 10 days as with twice that number, and that the volume of business will not be diminished.

The 1913 show will again have Henri Cezanne as its general manager. A joint committee representing the six trade associations has full control over the exhibition. The president of the joint committee is Armand Peugeot, and the other members are J. Niclausse, C. Rodrigues Ely and M. Cottenet, vice-presidents; A. Citroen, secretary; M. Turcat, treasurer.

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COLUMBUS, O., March 18—The big automobile carnival given here for the week ending March 15 by the Columbus Auto Trades Association was a success despite unfavorable weather conditions which prevailed for the greater part of the time. The crowds were good and sales were numerous.

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HARRISBURG, PA., March 15—The fourth annual show of the Harrisburg Automobile Dealers' Association was opened this evening at the Rex Garage and Arena Theater. Hundreds of persons visited the show on the opening night. The show will continue for 2 weeks. The 20,000 feet of floorspace is taken up by thirty-five exhibitors and over 100 automobiles, including thirty different makes of pleasure cars and trucks.

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BUFFALO, N. Y., March 18—At the first annual commercial vehicle show held in Buffalo, March 11-15, under the auspices of the Buffalo Automobile Dealers' Association, thirty exhibitors displayed their trucks and sales were numerous, one firm disposing of several trucks to a Niagara Falls company, while one motor vehicle was shipped to New Orleans. It is estimated that 30,000 persons attended the show, which closed Saturday night.

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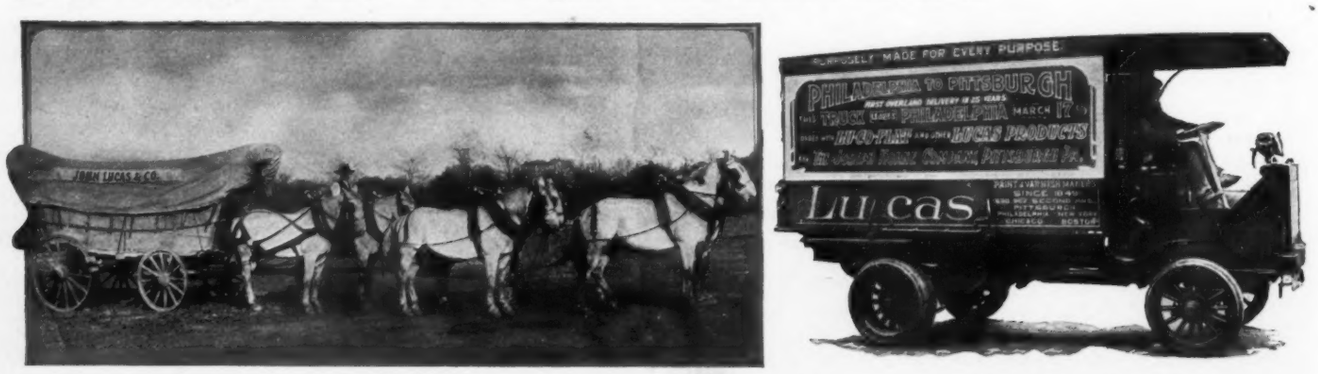
Alco to Make Philadelphia-Pittsburgh Trip

PHILADELPHIA, PA., March 17—A striking contrast of the old and the new methods of transportation was furnished yesterday morning when, escorted as far as the city limits by the original prairie schooner in the service of the paint company, a 3.5-ton Alco truck laden with a cargo of paint consigned by John Lucas & Co., of this city, to Joseph Horne & Co., of Pittsburgh, left Philadelphia for the first delivery of merchandise to be made by a commercial vehicle across the state of Pennsylvania.

The total distance to be traversed is over 350 miles, and as it is expected to complete the jaunt in 5 days a daily mileage of 70 miles will have to be maintained.



The old and the new—striking contrast of transportation methods by John Lucas & Co., Philadelphia, Pa.

Stock Car Race of 300 Miles for England

Race Is for Four-Cylinder Cars with Bore not Exceeding 3.543 Inches and 5.512 Inch Stroke

To Be Held on the Isle of Man September 25— Race May Be Cancelled If Entries Are Few

LONDON, March 7—The regulations governing the international stock car race for the Tourist trophy to be held on the Isle of Man, September 25, have at last been issued and they show the race of approximately 300 miles or eight laps of the circuit. The race is for four-cylinder cars with cylinder bore not exceeding 90 millimeters, or 3.543 inches, and 140 millimeters, stroke, or 5.512 inches. The minimum weight is 2,000 pounds as cars will compete in the race and includes driver, mechanic, fuel, oil, water, tools, etc. The cars must be stock in all particulars excepting that the angle of the steering column may be altered to suit the driver.

To insure stock throughout the rules are framed with special care and call for same make and size of carbureter and intake manifold as stock; stock exhaust manifold and muffler without cut-out, even if such is stock; no higher gear ratio may be used than the highest ratio fitted to stock cars; shock-absorbers may not be fitted; no extra oil feed arrangements to the motor permitted and any oil tank must be of stock size and in stock position; a gasoline tank to carry not less than 30 gallons may be used; mud guards for the wheels with continuous running boards must be used, the front guards being not less than 10 inches wide and the footboard and rear mud guards not less than 8 inches wide, and only wheels of sizes specified in the maker's catalogue shall be allowed.

The entry fee is $250 per car. The race may be canceled if not more than twenty entries are received by May 31. Entries will close June 30.

Order Fixed for French Grand Prix

PARIS, FRANCE, March 7—Victor Rigal, driving No. 1 Sunbeam, will be the first driver to start in the French Grand Prix race at Amiens on Saturday, July 12. This position has been decided by the drawing of lots, the complete order in which the cars will get away, probably at intervals of half a minute, being as follows: 1, Sunbeam; 2, Delage; 3, Opel; 4, Mathis; 5, Excelsior; 6, Th. Schneider; 7, Itala; 8, Peugeot; 9, Sunbeam; 10, Delage; 11, Excelsior; 12, Th. Schneider; 13, Itala; 14, Peugeot; 15, Sunbeam; 16, Th. Schneider; 17, Itala; 18, Peugeot; 19, Sunbeam; 20, Th. Schneider.

The race being run on a fuel consumption basis, it has been decided to allow the competing cars to fit gasoline meters of the type approved by the "octroi" of the city of Paris, on condition that the fittings are of such a nature as to make the introduction of fuel through the meter or the connections an impossibility.

INDIANAPOLIS, IND., March 17—Definite word has been received from the Peugeot company, of Paris, that two of its fastest cars, with Jules Goux and Zucarrelli as drivers, will be entered in the third annual 500-mile International Sweepstakes Race at the Indianapolis Motor Speedway May 30.

According to present arrangements Goux and Zucarrelli will arrive in America about May 12, and will proceed immediately to Indianapolis to become thoroughly acquainted with the Speedway before the day of the race. Albert Guyot, who is to pilot the famous English Sunbeam car, will arrive in America about the same time and will also train at the Speedway. Owing to the fact that all of these drivers are scheduled to drive in the French Grand Prix on July 12, it will be necessary for them to return to France immediately after the Indianapolis race.

Three Isotta Fraschini cars will be entered in the May 30 race in Indianapolis. One of these is a specially constructed machine and will be driven by Harry F. Grant; Trucco, the Italian driver, will be also on an Isotta and Gilhooley is the third man.

F. E. Edwards, chairman of the technical committee of the A. A. A., has been appointed to the same position in the 500-mile classic which takes place at Indianapolis on May 30. Until Mr. Edwards reaches Indianapolis Chester S. Ricker will be his official representative and after will act as his first assistant.

Reliability Run for Columbus

COLUMBUS, O., March 15—A 4-day reliability contest which will be conducted under the auspices of the Columbus Automobile Club will be run April 29 and 30 and May 1 and 2. The *Ohio State Journal* of Columbus, O., originated the plan and the name will be taken from that publication. The direction of details for the run is under the charge of the contest committee of the Columbus Automobile Club, consisting of L. M. Browne, Jack Means, Herbert A. Mason, Frank Girard and J. C. McIntyre. It has been decided to lay out the route from Columbus via Dayton and Richmond to Indianapolis, from Indianapolis to Fort Wayne for the second day, from Fort Wayne to Detroit on the third day and from that point back to Columbus for the fourth day. Already a number of cars have been entered for the reliability, both agents and owners. Several cups will be provided for the winners.

PHILADELPHIA, PA., March 15—The first week of the sealed bonnet, road-conditioning test being conducted by the Touring Bureau of the Automobile Club of Philadelphia was completed today and, judging by the amount of territory covered and information gleaned, gives promise of being productive of more accurate data than anything heretofore attempted in that line.

During the week a total of approximately 1,225 miles has been covered, a daily mileage of 175.

NEW YORK CITY, March 17—The Ajax-Grieb Rubber Co. has prepared for a mileage contest of its products from March 31, 1913, to April 1, 1914. There are 208 prizes ranging from $500 to $10 and aggregating $5,000 which will go to the drivers who get the most mileage out of their Ajax tires. When a tire is sold, the date and odometer readings are taken and a statement giving them is signed by the driver and owner. When the tire has arrived at the state of unserviceability the date and odometer reading are again taken by the company, when the tire is returned.

WASHINGTON, D. C., March 16—The tentative route for the motor truck reliability run of the *Washington Post*, May 5-8, has been selected, and the work of blazing the trail began today when a Marmon car, driven by Arthur Foraker and carrying Pathfinder Harry Duckstein, was sent over the course. The tentative route will carry the trucks through two states and the District of Columbia and will afford varying road conditions, including numerous hills and sandy stretches. The distance will be between 300 and 350 miles. Among the towns the contestants will pass through are Frederick, Md., Hagerstown, Md., Harrisburg, Pa., Shippensburg, Pa., and Baltimore, Md. Government officials are taking an active interest in the run and a number of them will be selected as officials.

NEW YORK CITY, March 19—The Orphans' Automobile Day Association of New York, Inc., will hold a meeting April 1 to talk over plans for this year's Orphans' Day on which some 3,000 children are to be taken out.

Digest of the Leading Foreign Journals

Array of Reasons Which Make French Truck Builders and Users Highly Conservative in the Selection of Wheels and Tires—Standardization for Draughtsmen—Practice of Oiling Through Fuel Spreads—Recent Technical Treatises

Analysis of Requirements in Truck Wheels.—The data in the present state of the art of building wheels for motor trucks are presented at length by Captain D. Renaud with special reference to the types of wheel and tire which should be selected. The leading points in his exposition of the subject are, with some omission of obvious arguments and much abbreviated, substantially as follows:

Wood wheels have so far been found most acceptable in practice for heavy loads, and they are found more durable if slightly cambered, so that the spokes are assembled in a slightly conical formation, and it is an advantage to have the wheel shaft inclined correspondingly, so that the spokes are in a practically vertical position when they support the load, but the adoption of inclined wheel spindles for the driving-wheels has met with the hindrance that this construction cannot be reconciled with the customary mechanical system of driving by chains or through one central driving-shaft actuating a set of bevel-gears on the differential. The cambered wheel has the advantage of a superior elasticity, as compared with a wheel having the spokes all in one vertical plane, of greater strength against shocks from the side—having brute strength in one direction and elastisicity in the other—and in being contracted more uniformly when a steel or an iron tire is shrunk onto the felly. But in a wheel with a conical spindle there is a decided tendency to push the hub and its bearings outwardly, causing considerable end-thrust, unless the spindle is inclined. The camber of the wheel and the angle of the spindle should therefore, if possible, go together, especially as the slant of the spindle is of advantage in getting square contact of the tire with the road, if the latter is crowned, as most hard roads are.

In a number of recent constructions with shaft drive, electric transmission, special four-wheel drives or in which the driving is done through transverse wheel shafts actuating gear-and-pinion sets on each wheel, the combination of camber and set has been realized. The shaft drive used in La Buire trucks is notable in this respect, the desired angle of the wheel shafts being obtained by a new design of the differential. This is shown in Fig. 1. The driving-shaft A turns the cross-spindle carrying the two satellites BB of the differential around in its own plane, thereby turning the sleeves C and D, each with two bevel-pinions, and one of these bevel-pinion sleeves thus turns the bevel-gear E while the other turns the bevel-gear F; and it is plain that with this arrangment E and F may be inclined at any desired angle of set, as exemplified to the right in the illustration. [A similar type of differential is employed in one of the Daimler-Mercedes truck models, as described and illustrated in The Automobile of June 13, 1912, page 1327.—Ed.]

The practice which has lately been somewhat widely adopted of forcing iron or steel rims upon the wooden wheel rim by cold pressure, instead of shrinking them on hot and allowing them to contract, cannot be recommended, as it has often been found to result in diminished durability. This is because the iron rim expands after the cold pressure ceases and allows the wooden structure to loosen up after having been compressed excessively. The need of retightening the wheel from the hub follows.

The diameter of truck wheels is decided in practice by a compromise between conflicting considerations. The small wheel has the advantage of strength and small weight; it also subserves the need of a large gear-reduction in the power transmission and contributes to stability by lowering the center of gravity of the vehicle. On the other hand, all roughness of the road surface becomes a matter of importance—a drain upon the power and severe upon the spring suspension and the occupants of the vehicle—if the wheels are too small. It has been observed that a truck with driving wheels of 60 centimeters diameter could not climb a paved grade of 3 per cent. which was only slightly slippery, because the wheels slipped at every projection in the pavement. Experiments with the military trucks have resulted in demanding a minimum diameter for the driving-wheels of 95 centimeters and of 85 centimeters for steering wheels.

When it is admitted that a certain capacity for the cushioning of shocks is a desirable quality in a vehicle and that it cannot be obtained from the vehicle springs alone at the speeds demanded of motor trucks—largely because after each shock there is a period of reaction and recoil in a vehicle spring during which it is not in a fit position to receive a new shock, although the vehicle is moving on and may receive such a new shock—it becomes necessary to decide in what particular manner elasticity shall be incorporated in the vehicle wheel, where, by reason of the wheel's rotation, the elastic element can always be in readiness to act as desired and with a yield proportionate to the severity of the shock.

To make clear the requirements, elastic wheels may be classified as those with rigid rims, comprising those with an elastic hub, elastic spokes or with concentric rims movable in relation to one another, and those with deformable rims, comprising all wheels fitted with elastic tires. The latter class falls into two sub-classes; those in which the tire is continuous and those in which the elastic element is composed of a number of units distributed upon the wheel rim at more or less distinct intervals. [The author seems to overlook the combination of concentric rims with a continuous elastic tire on the outer one.—Ed.]

The work demanded of the wheel is (1) to absorb vertical

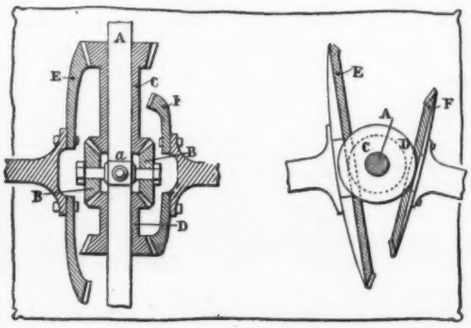


Fig. 1—The style of differential used on La Buire motor trucks, admitting of inclined wheels—driving shafts and reduced stresses upon teeth of bevel gears; thereby also rendering a greater gear-reduction practicable.

shocks acting in the plane of the wheel, (2) to obviate vibrations of materials, (3) to transmit the power yieldingly, (4) to assume transverse stability, to which may be added that (5) the circumference of the wheel must remain approximately circular, that the wheel must be (6) insensible to rain, mud, dust and snow and must be sufficiently robust without being too heavy. The adhesion to the road by which the traction through the driving-wheels is obtained must of course also be assured.

The very discussion of these diverse conditions will point out the type of wheel which is most logical.

When a wheel rolls over a lumpy road surface, the loss of momentum is so much more important as the weight of the parts which are caused to rebound is more considerable. And the shocks received are the better mitigated and absorbed the more directly they reach the elastic medium interposed between them and the rigid parts. These considerations argue directly for placing the elastic material in contact with the ground and for having the density of this material as low as possible; the property of low density being of especial value for the absorption or prevention of vibrations.

From this point of view, the wheels which respond best to the first and second of the working requirements are those fitted with elastic tires, and the elastic material ranks in this order:—Air, hollow rubber, solid rubber, metallic springs.

The elastic transmission of the motor power is well-enough met in all types of wheels excepting those equipped with telescoping spokes.

The need of lateral stability, on the other hand, eliminates the majority of special elastic wheels from consideration. At all turns of the vehicle and on roads which slope to one side, it is the wheels which must sustain the transverse stresses and safeguard the steering. The distance from the ground to the axle represents the lever arm by which the strains are applied. To reduce transverse displacement to a minimum, it is evident that the elastic medium should be placed as near as possible to the road surface. The nearer it is placed to the center of the wheel, the more it is necessary to provide special guide plates to prevent the buckling of the wheel. This consideration thus places the wheels in the following order of preference:—Wheels with elastic tires, wheels with double rims elastically joined, wheels with elastic spokes, wheels with elastic hubs.

All special provisions for strengthening an elastic element laterally involve increased weight, heavier shocks, more vibrations, sticking of sliding parts, increased care of maintenance and usually some form of lubrication, and for the latter only castor oil can be used, if rubber is employed in the construction, all other lubricants injuring this material.

With regard to the circularity of the wheel, it is evident that any flexion which constantly places the hub eccentric to the wheel rim results in a resistance equal to that met on an incline which is comparable in degree to the eccentricity [The author at this point seems to embrace a popularly accepted theory unthinkingly and without the necessary reservations, the theory holding true only if the elasticity is not exhausted in the flexion and if the flexibility curve is uniform, but not, as in the case of rubber tires, when this curve is strongly retrogressive, rendering the resistance to flexion very small at first and very great toward its limit.—Ed.]; and if the eccentricity of the wheel is made irregular by the use of separated rubber block tires. elastic spokes or multiple metallic springs, there are produced sinuous and periodic movements of rise and fall of the axle accompanied by trepidations or vibrations which are more or less harmful and detract from the quality of the transportation work.

All non-continuous elastic mediums should therefore be rejected in favor of the homogeneous elastic tire by the use of which the eccentricity created by the load is rendered regular and is reduced to a minimum.

Finally the simplest system admits most readily of robustness, and in this respect the wheel with solid rubber tires is pre-eminent, as this type of tire can be secured directly upon the smooth steel rim of the wheel by pressing onto the latter the metallic base of the tire, on one of the plans shown in Fig. 2.

The silence and road adhesion of the solid or hollow rubber tire clinch the logical preference for it, even if a wheel with additional elastic elements is chosen. At the last public tests of elastic wheels, the only type which performed satisfactorily under the conditions imposed—air-inflated tires being excluded—was the Ducasble wheel with hollow rubber tire, and while, like a solid rubber tire of 135 millimeters, of twin pattern, it can be fitted to vehicles carrying a load of 3,000 kilograms on the rear axle, it is most satisfactory at low-speed work. For truck work generally, the wood wheel with solid rubber tires is so far indicated as the most practical one by all civil and military experience, provided the dimensions of both wheel and tires, as well as rubber composition employed in the latter, are selected with close reference to load, speed and road conditions.

The all metal wheel, especially the cast-iron wheel, is superior in its resistance to climatic influences, as in the tropics, and it endures equally well or better, if it is protected against vibrations by means of a solid-rubber or pneumatic tire, but not otherwise. During the last half of the life of a solid-rubber tire fitted to it, the cast-iron wheel becomes subject to serious vibrations which are injurious to the vehicle and motor. Owing to its greater weight and uncompromising rigidity, it wears out the tire which is fitted to it at a comparatively rapid rate.

All the metallic wheels which are assembled by bolts and rivets have so far been found unable to endure speed and are, moreover, very noisy.

Since 1909 the French government has offered a subsidy for motor trucks, and the rate of this bonus is figured solely according to the economy per ton-kilometer demonstrated in practice for each truck type and without any restrictions regarding the wheels and tires. Out of 56 subsidized types, 44 are equipped with rubber tires, 8 have the rear wheels shod with iron tires and 4 have iron tires on all four wheels, but the last-named are in the way of disappearing from the field.

It is then clear that there can be no intrinsic economy in dispensing with the rubber tire equipment, since otherwise all would do so and gain a greatly reduced first cost, as well as a much wider market through their ability to sell at a much lower price.

The cost of solid rubber tires per kilometer, it has been ascertained, ranges from 10 or 11 centimes (2 cents) for a truck of 3,000 kilogram capacity to 16 or 17 centimes for a truck of 6,000 kilogram capacity, but these moderate figures can be realized only if the following rules are strictly observed.

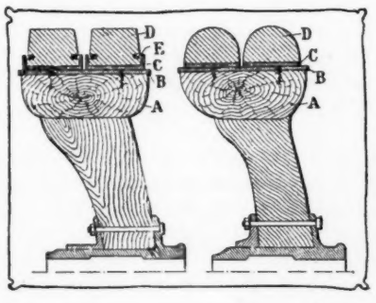


Fig. 2—Two systems of mounting solid-rubber truck tires on the iron rim of wood wheels. First, the Torrilhon method; tire secured by endless wire in channel-rim C. Second, the Bergougnan method; tire vulcanized to iron base C and latter forced hot upon wheel rim. Latter considered the superior method.

(1) Select tires according to the loads for which they will be used, and avoid overloads absolutely.

(2) Do not exceed an average speed of 25 kilometers per hour, and avoid blocking the wheels when braking.

(3) Have spare wheels, so that interruptions of service may be avoided.

(4) Examine tires every day and extract all foreign bodies which may have entered into them.

(5) During any prolonged interruption of work, jack up the wheel and axles and relieve the rubber from a continued load at a single spot.

The tire manufacturers have done their share toward economy by developing different compositions of rubber, each best

adapted for certain loads. Ranging from the material used for inner tubes to ebonite, these compositions attain different degrees of hardness and toughness by vulcanization. Only the hardest will vulcanize into a firm joint with iron or steel. Only those of neighboring grades will vulcanize together. These facts have led to the simplest tire construction, in which the steel rim base of the tire is vulcanized to a rubber composition which turns perfectly hard, this to the next grade, this again to the next softer one, and the last one of these thin layers to the body of the tire. A tire of this kind endures a load of 130 kilograms per square centimeter and resists a traction pull of 75 kilograms per square centimeter. If properly dimensioned for its work, it sustains in practice only 10 to 11 kilograms of load, and the traction pull on its material does not amount to more than .4 to 5 kilograms in the case of a 7-ton truck driven over a 12 per cent. gradient.

In stating the data of wheels and tires which have so far been established by the experience of the past five years, and all of which point to the wood wheel shod with solid rubber tires, it is understood that wire wheels for trucks have not yet been tried sufficiently or in fact been sufficiently developed to offer a basis for comparison; also that a possibility for effecting economy and efficiency with rigid wheels naturally continues to exist with reference to lines of work in which slow work and soft roads constitute the predominating condition. But the average motor truck finds it economical *raison d'être* only through the time and wage it saves by its speed and the expansion of the working radius which is due partly to speed and partly, in comparison with horses, to its indifference to fatigue.—From *Le Génie Civil*, Feb. 22 and March 1.

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STANDARDIZING the Draughting Room.—The firm of Seehase & Pansegrau in Berlin is now offering stencils and shapes by means of which draughtsmen can mark bolts and nuts of standardized dimensions without constructive effort, and similar contrivances are under preparation for other parts which have become standardized in various industries. The method used consists mainly in providing perforations of a transparent sheet at the determining points in the contours to be drawn. The pencil point is inserted in these holes and the marks so made are connected; though not necessarily before the inking. Some of the holes indicate centers of curves; others fix the relation to median lines of the construction. The supposition is of course that drawings are made only to a few standardized scales. For the factory's own use it is clear that the drawing of standardized parts may be entirely omitted, and the stencils may then be used only as a means for checking up the dimensions of the construction.—From *Werkstattstechnik*, March 1.

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OIL in the Gasoline.—One of the leading automobile manufacturers in France is now recommending the American expedient of mixing some lubricating oil in the gasoline in order to obtain a cylinder lubrication proportionate not only to the motor speed but also to the power and heat development of each explosion. Five per cent. of oil is said to be a suitable admixture, but it is recommended to follow this practice only while the motor is new and until the cylinder walls have become ground in. The motor is in this instance lubricated from a force-feed pump which is not co-ordinated with the throttle in any manner. *Omnia* now places the matter under the discussion with the query: If the practice is advisable in the case of a new motor, why is it not advisable always? At the same time the *Chauffeur Français* finds that a number of well-known expert drivers employ this auxiliary oiling method, usually in a three per cent. proportion, and that one manufacturer uses it in testing motors.

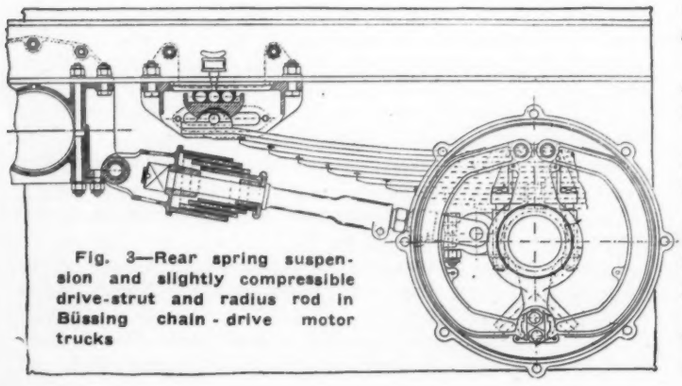

Fig. 3—Rear spring suspension and slightly compressible drive-strut and radius rod in Büssing chain-drive motor trucks

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PRIZE for an Automobile Diesel Motor—The Royal Hungarian Automobile Club, through its president, Count Alexander Andrassy, and its technical committee, has addressed a memorial to the International Association of Recognized Automobile Clubs recommending that a large prize be offered not only for a cheap and universal fuel which may be used in automobile motors, as these are now constructed, on which subject the international association has already taken action, but also for a motor construction which is fully adapted for automobile purposes and in which the cheap varieties of fuel now actually used in Diesel motors may nevertheless be successfully employed. The recommendation also includes a smaller prize for a motor which may be operated optionally with a variety of fuels without changes in its mode of operation.—From *Automobilwelt*.

—

CONSUMPTION of Fuel and Lubricant in Trucks.—From a table compiled by the authorities in charge of the event it is noticed that the relation between the consumption of fuel and that of lubricant in the trucks which took part in the French annual military trials of 1912 varies widely. One of the Berliet trucks holds the record in both directions, having used only 0.0412 liters of benzol per ton-kilometer and 0.90 grams of lubricant, but seven other Berliet trucks show much higher figures, though one of them comes close to the record for lubricant. Two Aries trucks both show very low figures for fuel and also below the average for lubricant. Four Renault trucks show a fuel consumption from 0.0454 to 0.0477 and a lubricant consumption from 1.10 to 1.50 grams; a very consistent performance. In two Cohendet trucks whose fuel consumption was within the same limits the lubricant consumption, on the other hand, almost reached the permissible maximum of 7 grams per ton-kilometer.

—

WARDING Off Vibration.—The rear spring suspension and the stiffly cushioning radius rod and driving-strut which form features of the Büssing motor truck, which is among those of best repute in Germany, are shown in Fig. 3, reproduced from *Der Motorwagen*. The construction exemplifies the tendency to produce constructively the necessary flexibility between running-gear and frame, in heavy trucks, while eliminating it from the frame proper.

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Memorandum of Articles Unadapted for Abbreviation

Among compendious treatises on highly specialized subjects which have recently appeared in continental publications, and copies of which, in the original language in each case, may be procured for those interested, are the following:

Bevel-gear Milling Machines. Serial, illustrated.—By Prof. Alfredo Galassini of Turin in *Werkstattstechnik*, Feb. 15, March 1 and to be continued.

The Use of Cast Steel Balls in the Shaping of Sheet Metal Parts, illustrated, 3 pages.—By E. Gay in *La Technique Moderne*, March 1.

Graphodynamic Investigation of a Gill & Aveling Four-Cylinder Automobile Motor with Variable Stroke. Serial, illustrated.—By A. Nerreter in *Der Motorwagen*, January 20 and 31, February 10 and to be continued.

Recent Lubricators—Illustrated descriptions of lubricating devices; completing the subject as previously presented in same journal; 30 pages. *Revue de Mécanique*, Jan. 31.

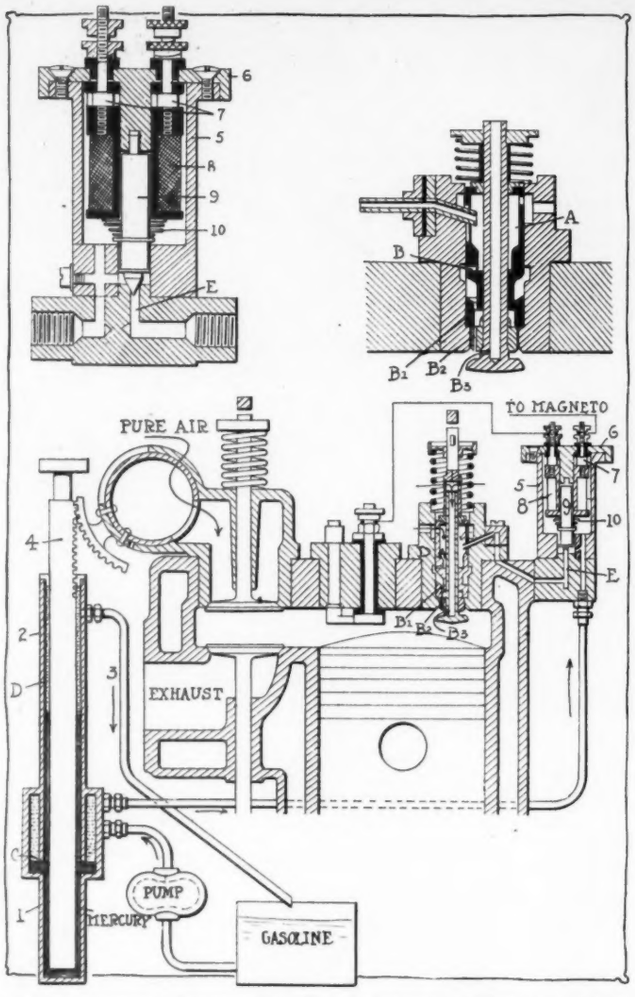


Fig. 1—General drawing of motor, showing the detail of the distributer with its magnetic coils, the pulverizer and the pressure-controlling device with its column of mercury. The fuel is carried from the tank to the pressure regulator by means of a pump placed in the position shown in the illustration

The New Bellem Oil Motor

¶ *This new motor runs on kerosene oil or crude and can be started directly on either one of these fuels while the motor is cold. This test was made upon the demonstration motor.*

¶ *It operates at the same speed as the ordinary gasoline automobile motor and being of the same size it can be substituted in the chassis for a motor of that type.*

¶ *The secret of the invention is the complete pulverization of the fuel which is effected by injecting it into the vacuum formed by allowing the intake valve to open only after the piston has gone some distance on its downward stroke.*

¶ *The valve mechanism consists of two principal parts; a pressure regulator and a distributer. The pressure is controlled through varying the height of a column of mercury and the amount of pressure used does not in any way affect the quantity of the fuel.*

¶ *A magnetic coil controls the distributer, whose opening is independent of the motor speed. A magnetic control is used which renders the opening dependent on the weight of a needle valve and the strength of a spring.*

French Kerosene Motor for Automobiles

Bellem Engine Starts Cold on Kerosene and Runs on Any Kind of Crude Oil—Uses No Carbureter nor Compressed Air

A FOUR-CYCLE motor capable of starting up cold on kerosene, of running on any kind of crude oil, weighing no more than a car motor, having a normal compression, having no carbureter and using no compressed air, has been produced by M. Bellem, a French engineer. This motor has passed beyond the experimental stage, for, it is claimed, licenses to construct have been secured by Delaunay-Belleville and by Messrs. Sautter & Harle, a French firm employed largely on army and navy work.

The similarity between the standard type of car motor running on gasoline and the Bellem, consuming kerosene or crude oils, is found in the fact that the former can readily be converted to the latter. Most of the experimental work has been done on motors so converted.

On the Bellem there are the conventional mechanically-operated intake and exhaust valves, but the intake, instead of admitting gas, allows pure air to pass through and does not open until 30 degrees before lower dead center. It closes about 30 degrees after lower dead center. The exhaust valve has the usual timing.

Automatic Intake Valve

In the head of the cylinder is fitted a combined automatic intake valve and pulverizer. With the main valves closed, there is a considerable depression in the cylinder during the first portion of the intake stroke. The suction of the piston opens the automatic valve illustrated in detail in Fig. 1. A charge of fuel having been brought up to this valve under pressure, the liquid and at the same time a certain quantity of air are brought in from A to B, through the holes B1 and then through B2. Finally, pure air is drawn through the hollow stem of the valve and the holes B3, completely pulverizing the fuel. Strong claims are made for this type of pulverizer working in a partial vacuum. In a recent test, a stone-cold, single-cylinder demonstration model was cranked by hand with the ignition cut off. At each exhaust stroke a puff of vapor came through the port, and on a mirror being held before it not a trace of condensation was to be seen. The inventor claims that he obtains cold vapors. A demonstration of this is to place a metal tube near the exhaust, heat it by a soldering lamp and drop kerosene onto the hot tube. At the same time the cold motor is cranked by hand, when the vapors coming out of the exhaust port are indistinguishable from those obtained by burning kerosene on the hot tube. *The demonstration motor, after standing all night, had cold water from the city mains run into its jacket and was started on the first pull of the handle against compression. This was repeated several times after the cylinder walls had been allowed to cool by a constant circulation of water from the mains.*

After running for 5 minutes on kerosene, this fuel was shut off and crude oil allowed to flow. No difference could be detected in the running of the motor and the exhaust was perfectly clear. Speed variations were obtained from 200 revolutions per minute running light to 1,200 revolutions per minute under load. Varying the speed as quickly as possible by use of the throttle and ignition cut-out, it was impossible to get anything more than a slight puff at the exhaust; this puff lasted but

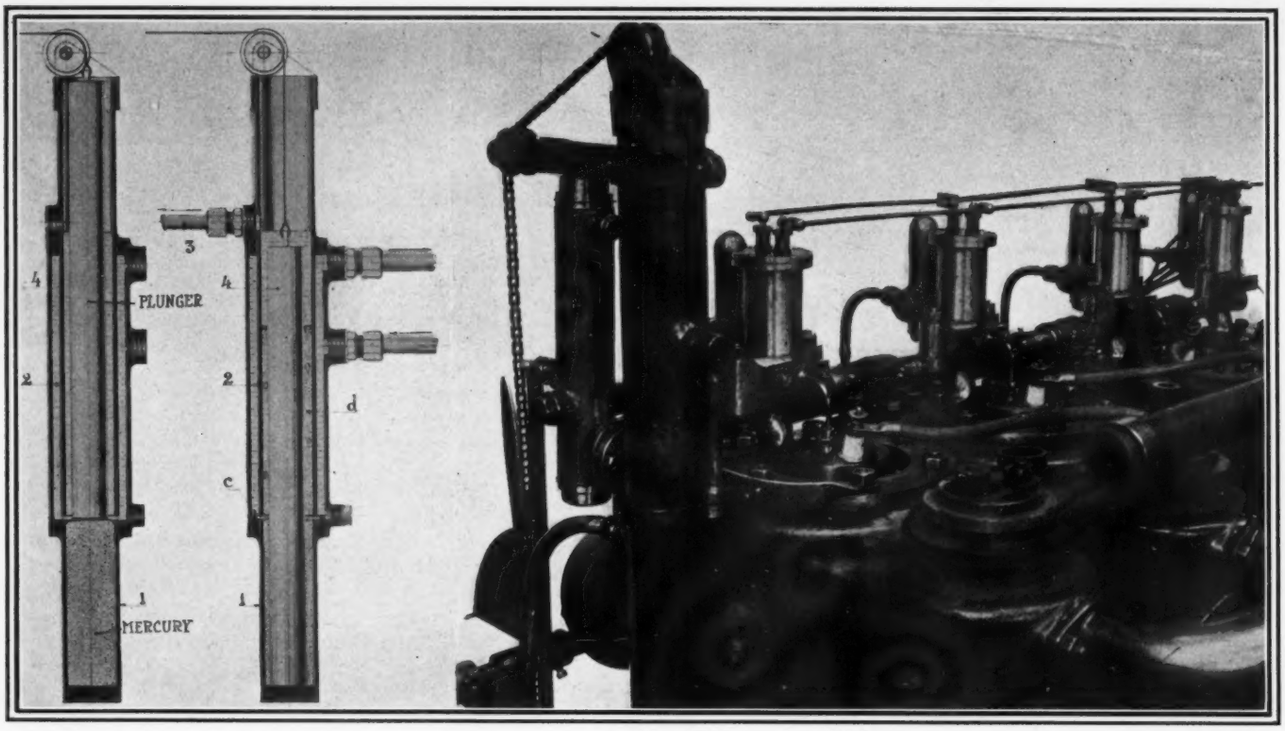


Fig. 2—Left, details of fuel-pressure device in Bellem motor. Right, top appearance of motor when fitted with the fuel pulverizing apparatus employed by Bellem

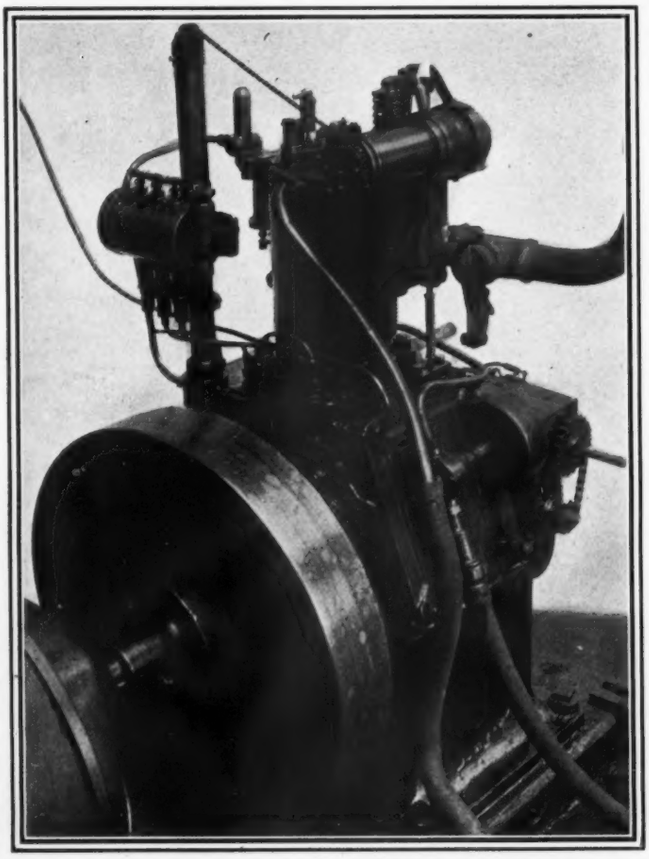


Fig. 3—Single-cylinder motor using the Bellem method of fuel pulverization. The spring of the auxiliary intake valve may be noted, projecting above the top of the cylinder, while the fuel pump is operated by silent chain from the extremity of the crankshaft opposite the flywheel

a fraction of a second and had nothing that indicated incorrect mixture.

The secret of the invention lies in the complete pulverization of the fuel in a partial vacuum. Experiments have shown that if the same pulverizer is used in a chamber at atmospheric pressure and with compressed air passing through the valve, the results are not the same, there being a certain amount of condensation. It is claimed that the late opening of the main air valve does not prevent a complete filling of the cylinder.

The fuel, as already explained, is delivered under pressure to the vaporizer. This necessitates the use of two distinct organs, a pressure regulator and a distributer. The pressure regulator is shown separately in Fig. 2. It is fed from a kerosene tank by means of any suitable type of pump, and consists of a metal vessel, 1, containing mercury, and welded to it, a metal tube the lower end of which is level with the top of the mercury. In the tube is a plunger, 4, capable of being raised and lowered in any convenient manner, and, according to its position, varying the height of the column of mercury, D, in the tube 2. The height of the column of mercury determines the pressure of kerosene in the chamber, C. The excess of fuel passes through the mercury column and down the overflow pipe, 3, to the tank. The feed pump has a capacity slightly greater than that of the motor under full power. The amount of fuel flowing through the return pipe with the motor under power is insignificant and there is no danger of the mercury being carried through with the fuel. The plunger is connected to the air valve, thus a single operation, controlled either by governor or by hand, determines the pressure of fuel to the distributer and the amount of air admitted to the motor.

Distributer Does Not Regulate Fuel

It will be noted that the feed pipe connects the pressure chamber with the distributer placed to the right of the automatic valve. This distributer is shown separately in Fig. 4. The pressure being variable at will the distributer is not called upon to regulate the quantity of fuel in any way. Its opening has to be constant and independent of the motor speed. It will be readily understood that an opening which allowed the correct amount

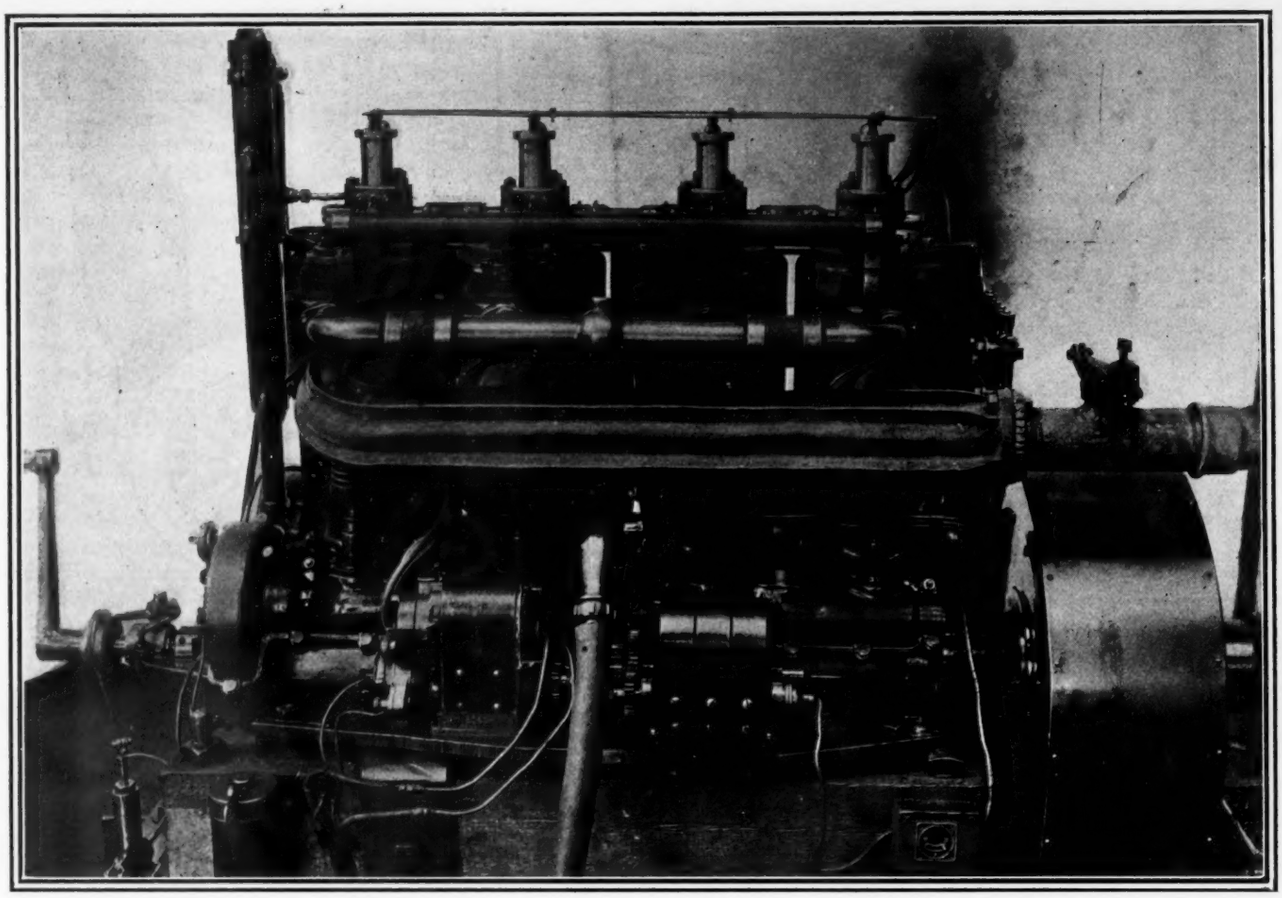


Fig. 4—Exterior appearance of Bellem motor adapted for automobile use. The magnetic control is governed by the wires running through the tubes along the top of the cylindrical distributers

of fuel to pass at 1,000 revolutions would be too great at 500 revolutions if a mechanical control was employed. With a mechanically-operated valve, also, there would be a possibility of the motor stopping with the valve open when the fuel would continue to flow until pressure had fallen off. The control is therefore magnetic, the apparatus comprising a soft iron core, 5, with a cover, 6, to which is attached the coil, 8, by means of the insulated terminals 7. In the center of the coil is a needle valve, 9, maintained on its seat by the coil spring, 10. At the moment of breaking contact on a low-tension magneto, the needle valve is raised from its seat and the fuel under pressure in the feed pipe passes through E to the pulverizer. The opening of the valve is practically instantaneous and its length of opening depends on the weight of the needle valve and the strength of the spring. The length of opening is obviously constant, whatever the speed of the motor.

In Fig. 1 the motor is shown with low-tension ignition. All the experimental models however, have been fitted with an ordinary type of high-tension magneto for the ignition and a low-tension magneto for supplying the current to the magnetic distributer. The compressions of the charge, firing and exhaust are carried out as on a normal type of four-cycle motor. When motors have been converted the compression has not been varied and has generally been between 60 and 70 pounds per square inch.

A test of one of these motors carried out at the laboratory of the Automobile Club of France is given herewith. The motor was a single-cylinder vertical of 100 by 150 millimeters, 3.9 by 5.9 inches, bore and stroke. The compression was 71 pounds per square inch.

The motor is adapted to marine, stationary or automobile use. As may be seen in the accompanying table, the crude fuel gave the greatest economy over a test running for an hour. It may be noticed that a higher rotative speed was used with the kerosene than with the other fuels and that the kerosene tests extended over a longer period.

SOME RESULTS OF TEST MADE ON BELLEM MOTOR IN LABORATORY OF THE AUTOMOBILE CLUB OF FRANCE

Module	Size of Blades in Mm.	Number of Hole	Temperature in Degrees Centigrade	Atmospheric Pressure in Mm. Mercury	Revolutions per Minute	H.P.	Corrections in Hundredths	Effective H.P.	Consumption Gallons per Hour	Specific Consumption Gallons per H.P. Hour	Observations
4	240x240	6.5	13	756	820	5.2	−2	5.1			Fuel: kerosene
4	240x240	6.5	14	756	813	5.1	−2	5.0	1.42	0.142	Test lasted 2 hours
4	240x240	6.5	14	756	811.5	5	−2	4.9			
4	240x240	6.5	15	756	811.7	5	−2	4.9			
4	240x240	7	10.5	771.5	773	5.1	−1	5.15	1.2	0.214	Fuel: Alcohol; Test, 1 hour
4	240x240	6.5	12	764.5	760	4.3	−1	4.25	0.396	0.920	Fuel, crude oil. Test, 1 hour

Motor, single-cylinder model of 100 by 150-millimeter bore and stroke. The motor was started cold with the use of kerosene only. The first test lasted 2 hours, the second test 1 hour, and the third also 1 hour. Acceleration from 183 revolutions to maximum speed under load was particularly easy.

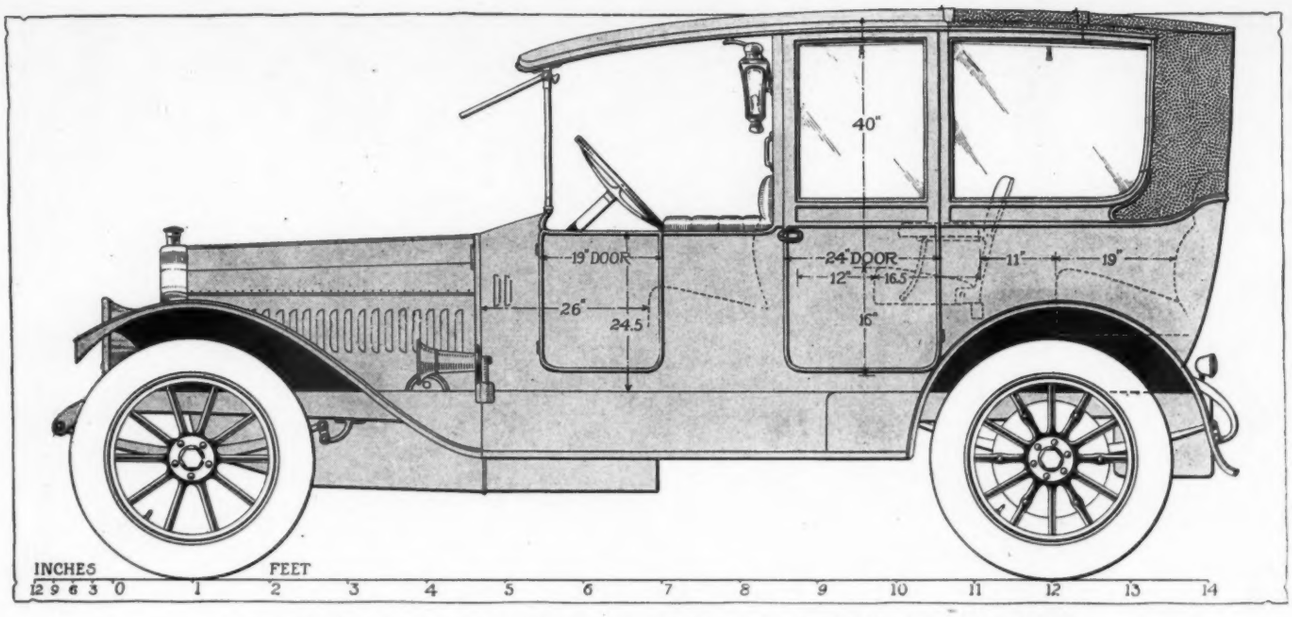


Fig. 1—Design to scale of limousine-landaulet body applied to White six-cylinder chassis

Limousine and Landaulet Types Combined

New Type of All-Season Body Meeting Increasing Favor—Notable Features Are Large Quarter Windows and New Curved Roof Line

ONE of the facts brought out at recent shows, and in particular at the last Importer's Salon in New York, was the increasing popularity of a new type of automobile body called, for want of a more comprehensive term, the limousine landaulet. As the name indicates, it combines the features of both. It has the large rear quarter windows of the limousine and the rear part of the top folds down in similar manner to the landaulet.

The ordinary landaulet has always the disadvantage of having the side quarters closed, thus preventing a clear outlook, whereas the limousine with its large spacious side and rear windows, has the distinct advantage of unobstructed view. On the other hand, the limousine is not capable of being opened up entirely, a serious limitation that suggested the need of combining the two types. This has been happily accomplished in the newer design. The limousine-landaulet has had a tryout for about two seasons in this country and for a much longer time in Europe where it originated. It is in no sense a freak design, but is a logical development in body types and it shows the public demand for an all-seasons car.

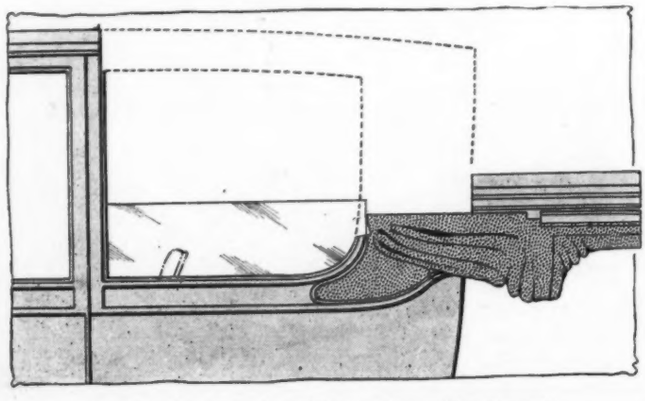


Fig. 2—Showing disposition of top when lowered

A suggested design of limousine-landaulet is given in the accompanying scale drawings. The body has flush side panels and its appearance is characterized by the straight line effect. The fore part of the body has low doors and cowl hood with storm visor windshield. The driver is free from hindrances that prevent his hearing all sounds and seeing clearly. For rain protection, drop curtains are used and when not required these are folded under the rear of the front seat.

Fig. 1 shows the complete side view of the car. The chassis is a White, Model G.F., 132-inch wheelbase, six cylinders, the hood of which has been changed slightly by sloping the top line up toward the dash and by bringing the sides outward toward the same point. This car is left drive with change and brake levers in the center. The length of the body space is ample to accommodate a seven-passenger body. The distance of the rear wheel center from the dash is 87 inches, which permits of a 24 inch door for entrance to the rear compartment.

No chassis changes are necessary. Standard front mudguards are used; the gasoline tank is under the front seat; the horn and headlights are standard and the dash lamps, which form part of the body equipment, are electric and let in flush in the dash. Provision for ventilating is also made in the dash below the lamps.

Fig. 2 shows the top folded down and the windows of the doors and quarters lowered. The windows are of the frameless type. It will be noted that the quarter window does not lower out of sight, due to the width of the body and the necessary clearance for the wheel.

The lowering of the top to effect the change illustrated in Fig. 2 is accomplished in practically the same manner as with the ordinary landaulet. The inside fasteners are released and the top lowered until the rear pillar or upright assumes a horizontal

position. The toprail section, rear of the first joint, is thrown out till it lines with the pillar, and the front section of the toprail is folded back onto the line formed by the pillar and the rear section of the toprail. When down the supports of the top are concealed inside the leather. The hinges require to be very heavy as the overhang of the top in its lowered position is about 26 inches beyond the bearing point.

The roof line has a generous sweep from back to front, the drop from a horizontal at the rear across the highest part being 3 inches, while at the front windshield the drop is twice that amount, or 6 inches. The best quality landau top leather is used to cover the top, back and sides as far forward as the glass opening and there are two joints on the top covered with iron plates to keep out the water. The fixed forward part of the roof is sometimes covered with leather to match the rear part or it can be finished in the customary manner and painted. This latter plan seems to be the one most in use.

Closed Compartment Seats Five

The rear compartment is large enough to provide comfortable seating for five people, three on the rear seat and two on small seats facing forward, the width of the cushions, space between the seats and head room is indicated by figures on the various views. The auxiliary seats are of the arm chair pattern, made to fold up.

The construction of the body is wood framing, 16 gauge aluminum sheet for the panels and metal mouldings. Concealed hinges are used on the rear doors and concealed handles on the fore doors. Grab handles and pillar lamps are fitted to the front pillar and a megaphone speaking tube is located at the right of the driver on the post in the center of the front glass division.

Hand buffed leather, black and dull finished, is used for trimming the front compartment, the seat and back being tufted. The distance between the steering wheel and the seat back is 15 inches without compressing the leather, and a space of 9 inches is allowed under the wheel to the cushion.

A very suitable trimming for the interior of the rear compartment is a light Bedford cord, with lace to match, leaving a suggestion of brown in the design. The carpet should be similarly marked and the curtains striped silk to harmonize in color with the lace and cloth. A suggested interior appointment is a large size toilet case, complete with watch, mirror, etc., covered with drab Morocco with the tops silver mounted. This is placed in the middle of the front division. In the front part of the permanent roof is placed a silver mounted dome light and cord hatrack, and an electric cigar lighter could be placed on the side opposite to the mouthpiece of the speaking tube. The door pull to handles are light colored celluloid. All metal parts are silvered and the interior woodwork is natural finished mahogany.

Large pockets are located on the doors and in trimming the body, the carpet line should come far enough up on the sides, doors and front to protect the material from being damaged by the feet of the occupants. The thickness of the rear seat cushion should not be less than 10 inches nor more than 12 inches, the slant from back to front 3.5 inches and the back to be properly shaped and thick.

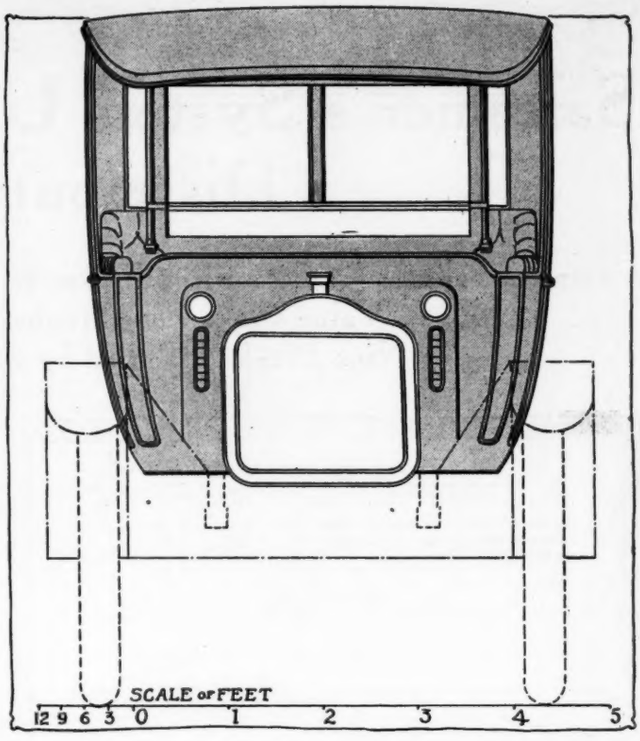


Fig. 3—Front view of limousine-landaulet design

For touring the trimming should be fitted with slip covers, so that the interior can always be made clean and free from dust. When selecting the trimming of a closed body it is becoming more the custom to consider the material and fitting from a sanitary standpoint. Many bodies are now finished inside entirely with wood except the seat cushions and the backs and sides of same. Charming effects are produced with these wood interior decorations and some combinations with wood panels and cloth borders form artistic and beautiful contrasts.

The tendency for beautiful dark colors is the prevailing idea in painting this year, and for the design illustrated, a rich dark blue for the body panels with the upper part black and black mouldings would be very suitable. The chassis could be painted blue, like the panels, with lighter blue and black striping.

The detail construction of the top will form the subject of the article to follow, in which a description of three methods of folding tops of these vehicles will be included.

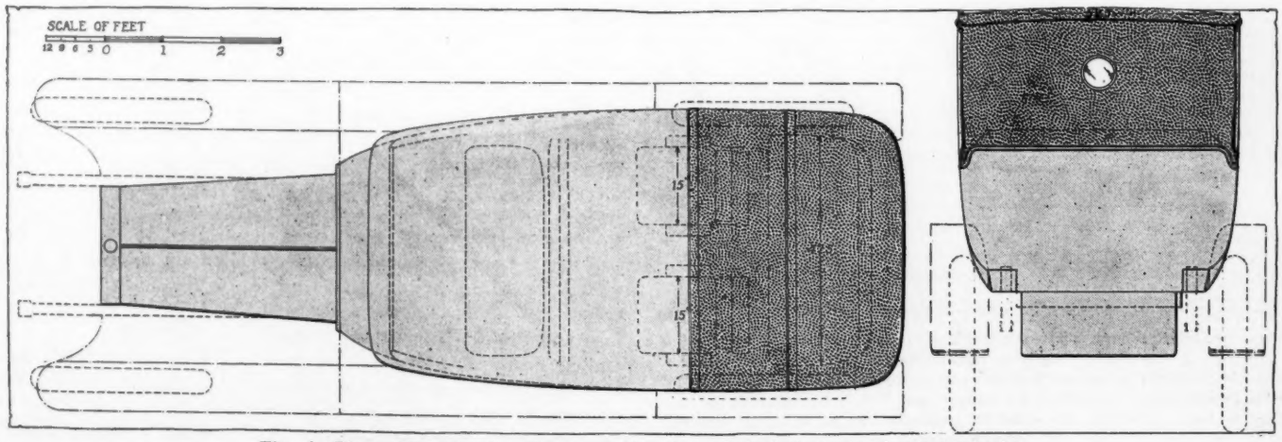
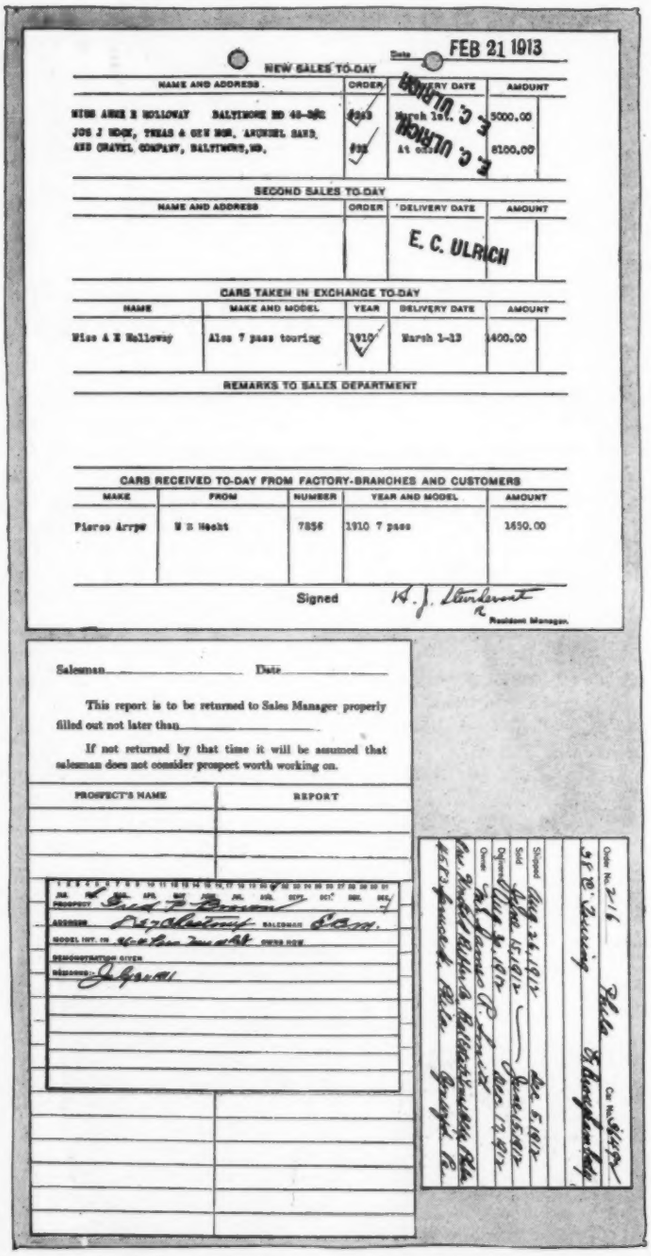


Fig. 4—Plan and rear elevation to scale of suggested limousine-landaulet body

Salesmen's System Used by Pierce-Arrow Distributing Agent

Complete Scheme for Recording Prospects, Follow-up Work, Sales and Their Exact Money Value Make Foss-Hughes Co.'s Selling Organization Strong —Nine Blanks Handled by Salesmen and Office Are Used



NEW SALES TO-DAY — Date FEB 21 1913

NAME AND ADDRESS	ORDER	DELIVERY DATE	AMOUNT
MISS ANNE E HOLLOWAY BALTIMORE MD 40-302	4949	March 1st. E. C. ULRICH	5000.00
JOS J HOOK, TRUST & GEN MGR, ARUNDEL SAND AND GRAVEL COMPANY, BALTIMORE, MD.	950	As soon as E. C. ULRICH	6100.00

SECOND SALES TO-DAY

NAME AND ADDRESS	ORDER	DELIVERY DATE	AMOUNT
		E. C. ULRICH	

CARS TAKEN IN EXCHANGE TO-DAY

NAME	MAKE AND MODEL	YEAR	DELIVERY DATE	AMOUNT
Miss A E Holloway	Alco 7 pass touring	1910	March 1-13	1400.00

REMARKS TO SALES DEPARTMENT

CARS RECEIVED TO-DAY FROM FACTORY-BRANCHES AND CUSTOMERS

MAKE	FROM	NUMBER	YEAR AND MODEL	AMOUNT
Pierce Arrow	W B Hecht	7856	1910 7 pass	1650.00

Signed H. J. Sturdevant, Resident Manager.

Salesman_____ Date_____

This report is to be returned to Sales Manager properly filled out not later than_____

If not returned by that time it will be assumed that salesman does not consider prospect worth working on.

PROSPECT'S NAME	REPORT

Fig. 1—Daily record sent from Foss-Hughes branches to Philadelphia main office
Fig. 2—Monthly salesman's follow-up report
Fig. 3—Prospective customer's filing card
Fig. 4—Card used by the Foss-Hughes Co. for making file records of car sales

SALESROOMS are no exceptions to the rule that a good system—which, it stands to reason, is the only kind worth using—tends in every case of its application to reduce loss and waste and to augment profits. A good salesroom system has the purpose, not to enslave the salesmen, but to make them freer in their application to their work and to prevent losses of sales by neglect on the part of individuals. Incidentally, it affords a possibility for the sales manager to gauge the men of his staff and to supply them with opportunities for increasing the business of the company and their own income. In short, a salesroom system enables a manager with brains to bring all his executive abilities into play.

Coming down to specific instances, it is a striking fact that the companies selling the highest-priced cars in important cities are almost unexceptionally using sales systems. One excellent system is in use by the Foss-Hughes Co., who has the Philadelphia agency of the Pierce-Arrow company and it is described below in detail, together with a complete set of illustrations of all the forms used in connection with it. The company has branches in Philadelphia, Baltimore, Providence, Wilmington and Washington. The Philadelphia office employs four salesmen for city work and a traveling man working on the road throughout the year. There are nine forms, as follows:

1. **Salesman's daily report.**
2. **Prospect's file card.**
3. **Salesman's monthly report.**
4. **Contract sales blank.**
5. **Sales file record card.**
6. **Sales force monthly record.**
7. **Second-hand car stock record.**
8. **Daily business report to main office.**
9. **Traveling salesman's weekly report.**

The order in which these forms are mentioned indicates the order of their application in case of a transaction beginning from the first visit to the final sale, including the trading in of a used car, if such is the case. The best way of forming a conception of the workings of the system is by considering each form in the order of use.

1. **Salesman's Daily Report**—Whenever a salesman comes in the store at evening, he fills out the daily report, using for this purpose a copy of the blank, Fig. 7, and making out a carbon copy. He enters the date of the day on the top of the sheet and then enumerates his various visits and their results. The sheet used for this purpose is printed on rather thin white paper, which is lined and printed black and 8.5 by 5.5 inches. Having done this, he signs the report, turns over the original to the office of the company and keeps the carbon for himself, storing it in a suitable place in his desk. Of course, he has his own pocket records in addition to the large daily reports, so that at any place and time he can inform himself on the condition of any pending or possible deal by referring to a notebook. All the salesmen's reports of this kind are kept together in one file in order of the dates, being ready for reference at any time.

2. **Prospect's File Card**—When the salesman's report is re-

¶ The system, while using nine different forms, is not cumbersome and imposes upon neither the energy of the salesmen, whose business it is to sell automobiles, nor upon that of too great a part of the office staff. ¶ The management sees to it that the system works out to the advantage of both the business and the salesmen. System is considered by it a helpful brownie and not a specter haunting the men when they are at work. This causes the men to adhere to the system. ¶ By promptly living up to the requirements of the system, the salesmen's work is made easier, as a number of detail operations otherwise weighing on their shoulders is removed, enabling them to devote all their energies to the work which is worthy of their efforts and to always operate at high efficiency.

ceived by the office, it is turned over to a clerk, whose business it is to put the information in a more handy form. For this end, a prospect's card file is used, in which there is a card for every person called upon by any one salesman of the force. This card is shown in Fig. 3; it is 5 by 3 inches, printed on thin white cardboard with blue lines and black letters. In filling out this blank the clerk first records the date, as he transfers the information from form, Fig. 7, to form, Fig. 3, in the same order as they appear on Fig. 7. The date of the first call is recorded by checking off the name of the month and the day of the month, as seen in the illustration. Then follow the name and address of the prospective customer. Spaces are provided for recording the dates of later calls and of a demonstration, if such is given, as well as the result of the same. The name of the salesman or rather his initials, the model of car in which the person visited by him is interested and the make of car owned by him at the time of the visit are also recorded in spaces provided for these records.

3. Salesman's Monthly Report—In order to keep prospects properly followed up, the sales management of the Foss-Hughes Co. makes use of monthly report orders, Fig. 2, a white blank, 5.25 by 8.5 inches in size, and lined and printed in black. About once in 4 weeks the sales office goes over the files of prospective customers which contain the cards, Fig. 3, and makes out one or more report orders for each salesman, on which the names of his prospects, so-called, and space for a report on the status of each case are given. After 10 days the report must be returned to the sales manager with an intelligent statement of each prospect's case. Whatever cases are not reported on satisfactorily become lost to the salesman; assuming that he is not pushing the prospect properly, the card is removed from the salesmen's prospects' file and placed on the open file, which is ready for any salesman's reference. Whoever follows up a prospect filed in this file is credited with the sale. This scheme naturally stimulates every man on the staff to close his sales as rapidly as possible.

4. Contract Sales Blank—When a sale is closed the salesman dictates the sales contract which is made out in the office, using a form, Fig. 5, the reverse of which is shown in Fig. 6. The contract blank is 9.5 by 11 inches and is made out with a carbon copy on green paper. Reference to the illustrations shows that the contract is a fine example of this type of form, providing for all necessary points of information and leaving no room for any doubt as to its contents. When the deal is closed, the salesman signs for the company and the purchaser opposite to the space for the salesman's signature.

5. Sales File Record—Sales are recorded on cards which are kept in a file; a sample card is illustrated in Fig. 4. This card is 5 by 3 inches and on the front side, Fig. 4, the name of the purchaser and his address, the model of car sold to him and

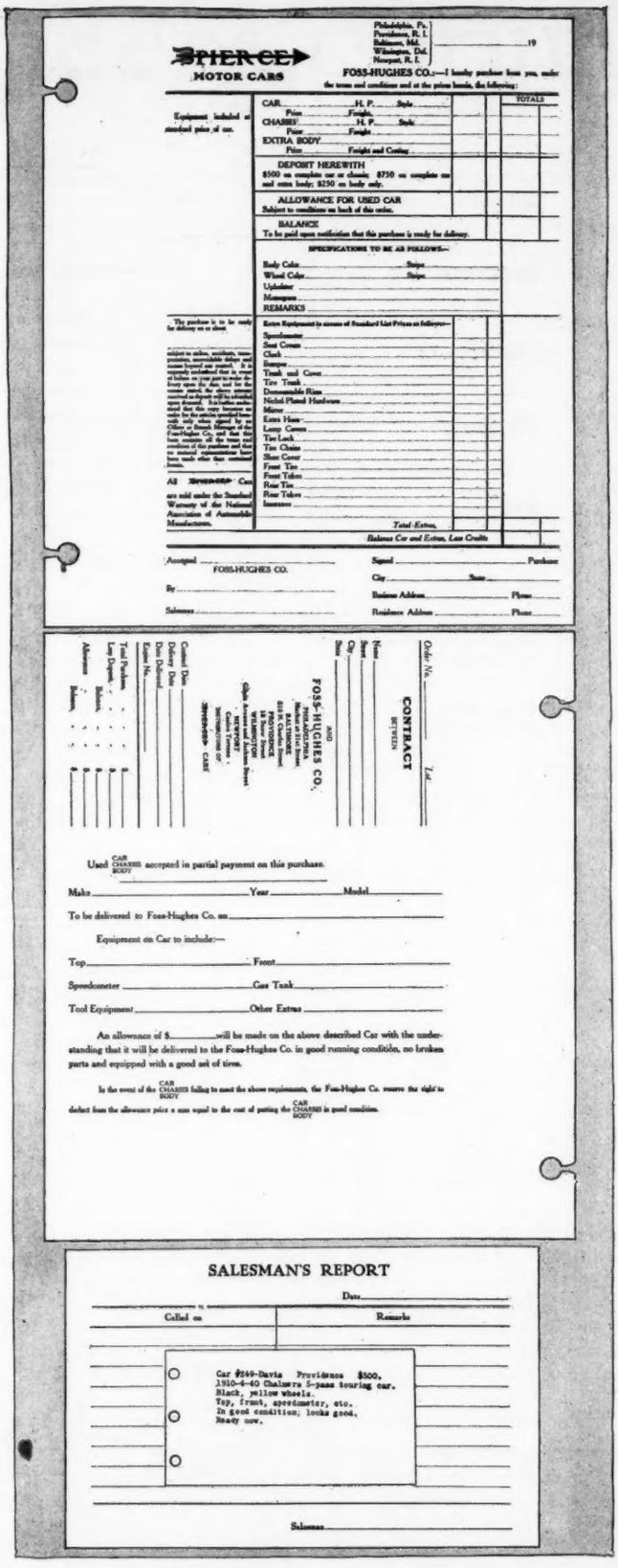


Fig. 5—Sample blank of car sales contract in the Foss-Hughes Co.'s business
Fig. 6—Reverse of the sale contract blank
Fig. 7—Daily report blank for car salesmen
Fig. 8—Sample loose leaf carried in salesmen's second-hand car stock booklet

REPORT FOR WEEK ENDING _____

	Place.	Hotel.	Owners Seen.	Prospects Seen.	Sales.
MONDAY:					
TUESDAY:					
WEDNESDAY:					
THURSDAY:					
FRIDAY:					
SATURDAY:					
Expense For Week:					
REMARKS:					

Fig. 9—Weekly report blank used by the Foss-Hughes Co.'s traveling salesman

the dates of sale, shipment from factory and delivery to owner are recorded. The orders are numbered consecutively every season but are filed alphabetically according to the owners' names. The same card shows that a car was sold to James R. Smith on June 15, 1912, this being a 38 C touring model; it was shipped from the factory on August 26 and received by the owner on August 30. At the same time with the car the salesman sold to Smith an extra brougham body, to be delivered on December 17. Consequently, this body was shipped from the factory on December 5. The reverse side of this card gives the analysis of the sale, the amount paid for the car and the allowance made for a used car, if one was traded in. The same applies to the body, so that by a glance at the card the entire transaction may be overseen from the viewpoint of profit.

6. Sales Force Monthly Record—As soon as a sale is made it is also registered on a monthly sales sum-up sheet, Fig. 10, on which all the salesmen's names are entered. The date, model and price of each transaction is thus recorded, and at the end of the month it is easy to total the work of each man and to make out a comparative statement showing the business of each member of the sales force. Such a statement is considered an effective stimulus to slow salesmen.

7. Second-Hand Car Stock Record—As indicated above, the Foss-Hughes Co. accepts used cars when selling new ones and makes an allowance for their value when turned over. It is the consensus of general opinion that with sufficient capital on hand and with a correct valuation of the used car, an individual company can make good on the used-car proposition, although this does not solve the problem of the second-hand automobile so far as the industry as a whole is concerned. In order to be able to push the sale of used cars in cases where a new car cannot be placed, the company supplies small booklets to its salesmen and in these booklets fit thin, loose leaves, 4.5 by 2.5 inches, Fig. 8. When a used car is taken over by the company the sales department office fills out a loose leaf, for each salesman, which is given to the latter so as to keep him informed of what the second-hand department affords. Of course, when a used car is sold, the salesmen are informed to that extent so that they can remove the respective leaves from their books. The leaves are kept in the books, segregated into departments which differ between Pierce-Arrow cars ready for sale, such in the shop and likewise such coming to the company at a near date; and other than Pierce cars coming to the company and ready cars. Each slip, as Fig. 8 shows, gives model, description, equipment and price of the used car.

8. Daily Branch Report to Main Office—As the Foss-Hughes Co. operates in five cities, it is necessary for the four branches outside of Philadelphia to send regular reports to the main office at that town. The form, Fig. 1, is used for this purpose. It is 8.5 inches square and printed black on green paper. The report enumerates and details on the sales of new and used cars made during the day, the car receipts from the factory and has a space for remarks to the Philadelphia sales department. A carbon copy of this report is filed in the branch office, while the original goes to Philadelphia.

9. Traveling Salesman's Weekly Report—The traveling salesman mentioned at the beginning of this article not only sends in a daily report, Fig. 7, but also a week-end statement. The Saturday report, Fig. 9, is made out on thin, white paper, 8.5 by 5.25 inches, which is typewritten as seen in the illustration. The statement gives his stopping places for all days in the week, the number of owners and prospects whom he visited, and the amounts of the sales he closed from day to day. The bottom line of the report sums up all items for all 6 days of the week.

The only shortcoming of this system is the lack of a blank for reminding the salesmen of appointments. This could be done by having salesmen include on their daily reports the next appointment with each respective prospect. The clerk who handles the prospective customers' file would also have to work a card file containing appointment memoranda as follows:

March 17, 1913. (Prospect)
Oliver P. Smith. (Salesman)
Benj. McK. Snodgrass, 1507 N. 47th St.
38 C Touring. (Model int.)

All these cards would be kept in the order of their dates, and every day the clerk would take out all the day's appointment cards and hand them to the respective salesmen.

Peerless Sales Report For March 1913

	House	Bradshaw	Bramble	Morgan	Miller	Brownfield	Crusoe

Fig. 10—Monthly comparative record sheet, on which the sales of all the salesmen of the company are entered

The Engineers' Forum

Economy in Motor Fuel

Testing Various Combinations of Kerosene, Gasoline and Ether as Fuel for Motor Vehicles

¶ C. W. Prochaska thinks that the adoption of kerosene as a motor fuel would result in an increase in price, due to the stimulated demand.
¶ W. O. Dixon gives information on the use and abuse of Motor Spirit, the new fuel for automobiles and motor trucks.

NEW YORK CITY—Editor THE AUTOMOBILE:—In our experimenting we have followed lines somewhat different from those usually taken. We have aimed to strike a happy medium and to go to the extreme on a Simplex car rated at 50 horsepower. Since last August we have used 70 per cent. kerosene, 29 per cent, 72-test gasoline and 1 per cent. ether. The cost averaged $13.80 per hundred gallons.

On several trucks we used straight 70 per cent. kerosene and 30 per cent. 70-test gasoline. In each case we supplied a small 1-gallon tank placed between the cylinders of the motors or else on the dash. Ordinary gasoline was used for starting the motor. We recommended that the motors be treated with an ample charge of denatured alcohol about twice a week, after the vehicles were turned in at night.

Our objects for making these tests were several. Kerosene alone will always give more or less trouble because of the extreme necessity to vaporize it under all conditions, especially on cold days, the number of connections and the fact that for starting the motor a fuel of higher test than kerosene is required.

From our experience, the use of kerosene alone is bound to create carbon. Without carbon, no explosion will take place. The odor is very offensive. We have used kerosene without the addition of water but the necessary fittings are so costly as to render this prohibitive for use in commercial vehicles. After careful investigation, we have come to the conclusion that, should kerosene come to be used as fuel for automobiles or commercial vehicles, the price would not remain the same because the increased demand would unquestionably cause the producer to raise the price. Also the adoption of kerosene in place of gasoline would necessitate radical changes in the motors themselves as well as in carbureters.—C. W. PROCHASKA, Gallagher-Tompkins Co.

On the Use and Abuse of Motor Spirit

CHICAGO, ILL.—Editor THE AUTOMOBILE:—The new power fuel Motor Spirit, while being designated chiefly for heavy duty gasoline engines in automobile trucks, tractors, etc., will undoubtedly find its way into the tanks of many pleasure cars, on account of its greater range of mileage and its lower cost.

Motor Spirit, while it belongs to the same group as naphtha and gasoline, differs in some respects, and must be used according to its peculiarities. For purposes of power, in the production of which it ranks well up with the so-called high-grade gasoline, Motor Spirit yields an increase of over 10 per cent., and is adaptable to all styles of motors now using gasoline.

The pungent odor noticeable from the liquid Motor Spirit, which is in some cases disagreeable, is almost entirely absorbed in the process of combustion, and leaves the exhaust almost odorless.

The bluish-white or gray smoke noticeable in the exhaust is not continuous, but is due to a sudden opening of the throttle, which throws an abnormal load on the carbureter and intake manifold, causing unusual friction of air along the inner surface of the manifold, which friction absorbing suddenly all liquid drops caused by condensation along the walls of the cold piping, carries into the combustion chamber a charge of raw spirits too rich to be entirely consumed, so is exhausted in the form of smoke, or incomplete combustion.

This fault is noticeable only in the colder weather and in a cold motor, and can be entirely, or nearly, overcome by jacketing the intake manifold above the carbureter, either for warm water or the hot blast from exhaust. If jacket is attached it should cover as much of the manifold as is practicable, and by all means should cover the parts which lay horizontal, and in which are possible pockets for lodgment of any fluid condensation.

If warm air is to be taken through the carbureter, it should be taken at both the initial, or primary, air intake, and the auxiliary or high-speed part, so that sudden opening of throttle will not cause the motor to load or back-fire when cool. The carbureter should be adjusted to a warm motor, as this is its running condition, generally allowing more air in proportion for the spirits than for gasoline, keeping the volume of mixture as thin as possible, that is feeding as little fuel as possible.

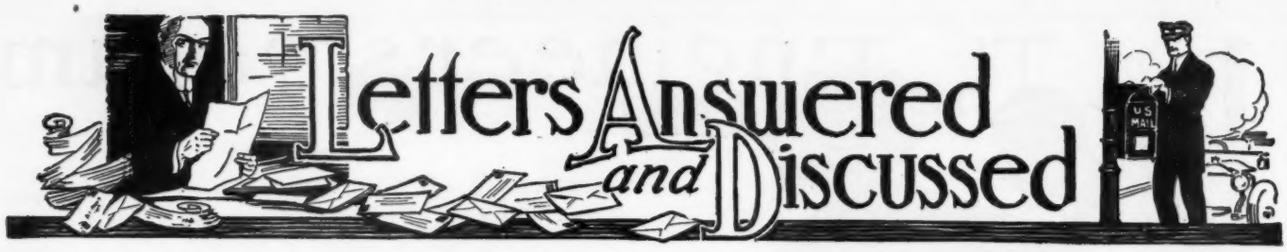
The thinner the mixture, the less the condensation. The less the condensation, the less the smoke. The less the smoke, the more the mileage.

The walls of lubricant built up in the cylinders and on the piston are not affected by Motor Spirit as quickly as by gasoline, which indicates that the amount of oil being used with gasoline can be materially decreased with perfect safety in using the Spirit. In brief, the best results, both in power and mileage economy, from the use of Motor Spirit, are obtained with just as small amount of both lubricant and fuel as is possible, using kerosene as a cleanser frequently—about a pint through primer, or through carbureter directly into air intake, once a week, and keeping the ignition system in tune.

Again—do not use an over-rich mixture.—W. O. DIXON, Standard Oil Co. of Indiana.

SYRACUSE, N. Y.—Editor THE AUTOMOBILE:—One big source of gasoline loss is in small leaks. Very frequently the gasoline valve or some of the unions leak just a drop now and then, but inasmuch as this drop is going on for 24 hours a day, it amounts to a great deal. For this reason all such places should be examined at regular intervals.

Touring in the country gives the best possible chance for economical operation, as it allows the motor to be used at a more economical point in its power. Probably 20 miles per hour represents the best speed for economical operation.—ARTHUR HOLMES, H. H. Franklin Mfg. Co.



Replacing Dry Cells with Storage Battery—Transmitting Power Through Spring—Cleaning Mohair—Long Stroke Advantages—Removing Carbon Deposit Pressures in Different Parts of Motor—Friction Drive—Strange Spark Plug

Using 6-Volt Storage Battery

EDITOR THE AUTOMOBILE:—In your department of Letters Answered and Discussed in THE AUTOMOBILE for March 6, you discussed the use of a storage battery to replace dry cells in the Delco ignition system for a 1911 Cadillac. Your subscriber asked whether he could replace the dry cells with a 6-volt battery and generator. I have been considering the same change with the exception of installing only the battery, but was dissuaded from doing so by the Cadillac people, who said, if I understood them correctly, that the system was made for dry cells and that it would not operate with a storage battery. Did I get this right? If I can replace the dry cells with a 6-volt battery I should like to do so. Perhaps I misinterpreted the discussion of the matter in THE AUTOMOBILE, as perhaps the additional unit of which you spoke was necessary because a generator was to be used. Could a 60-ampere-hour 6-volt battery be used in this case, or would it require an 80-ampere-hour 6-volt?

I might state that my principal object in changing from dry cells to a storage battery is to secure a trouble light for use in inspecting the engine and for tire troubles at night.

New York City. J. D. MARTIN.

—It would not be a feasible plan to use the storage battery for ignition unless you were installing a complete generator set, as mentioned in THE AUTOMOBILE for March 6 under the head of Letters Answered and Discussed. The reason for this is that the amperage of the storage battery of ordinary size would not be high enough. The best way to handle the situation would be to use your dry batteries for ignition and to purchase a small storage battery, say of 40 ampere-hours capacity, for exclusive use in your trouble-finding light. You could purchase the battery and lamp complete from any of the automobile supply houses for about $10. This could be recharged when necessary at a cost of about 25 cents. With one of these sets the lights would burn for more than 10 hours when used intermittently.

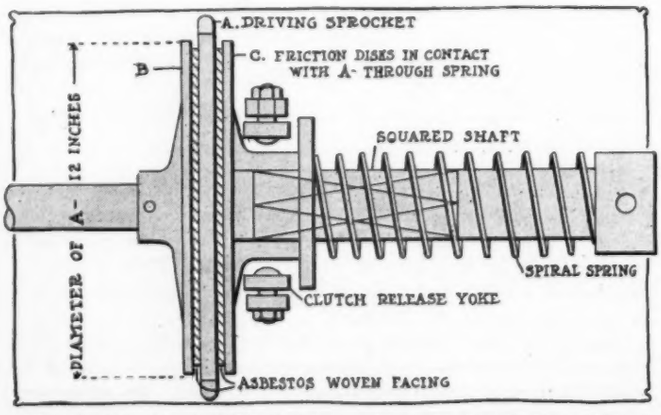


Fig. 1—Drive suggested for cycle-car type of vehicle with 10-horsepower motor

Spring Pressure to Transmit 10 Horsepower

Editor THE AUTOMOBILE:—I am building a light four-wheeled vehicle on the lines of the cyclecar now so popular in Europe, and would like to know how big and how much spring pressure is needed for the clutch in the accompanying drawing, Fig. 1, to transmit 10 horsepower for a car weighing, with two passengers, 800 pounds complete.

A is the driving sprocket held in contact with B and C disks by spiral spring, diameter D is 12 inches faced with Raybestos or similar material. Kindly let me know how much spring pressure is needed to transmit 10 horsepower to such an 800-pound car with a four-to-one gear ratio and 28-inch wheels?

New York City. WILLIAM SCHULZE.

—You would require 200 pounds for an absolutely sure drive. This is not an abnormal spring pressure for even a light car and could be readily controlled by a good linkage. The diameter of the spring is determined by the amount of space you can leave for it. The bigger the diameter, the more resilient the spring.

Cleaning Mohair Top

Editor THE AUTOMOBILE:—I have a mohair top on my automobile that is lined with a blue cloth. The cloth is badly stained and I would like to clean it. Is there anything that you know of with which it can be cleaned?

Ravena, N. Y. L. T. BURNS.

There is only one way to clean mohair. That is by the use of castile soap and warm water. If you attempt to use gasoline or any of the other volatile cleaners you will destroy the rubber interlining in the top and render it leaky. The method of procedure in cleaning is as follows:

Secure a fairly soft nail brush from any drug store and a cake of pure castile soap. Bring a pail of water to the boiling point so that by the time you get the water to the scene of operations it will be at about the temperature at which you can dip your hand in it without fear of scalding yourself. Dip the brush in the water and then rub it over the surface of the castile. This will coat the bristles of the brush with soap. The spots on the cloth are rubbed thoroughly with the soap until the white lather which will appear when first rubbing has nearly vanished. With a sponge wipe off the soap and allow the top to dry. If the spot reappears on drying, the process should be again repeated.

Buying Second-Hand Car

Editor THE AUTOMOBILE:—I should like to ask a few questions regarding second-hand automobiles. Could one buy a second-hand Hupmobile for $250?

2—What is the cheapest four-cylinder runabout manufactured?

3—How long has the Ford company been building the model T?

4—What should a second-hand 1911 Ford model T sell for?

5—Who makes parts for the Dragon car?

Washington, D. C. G. E. S.

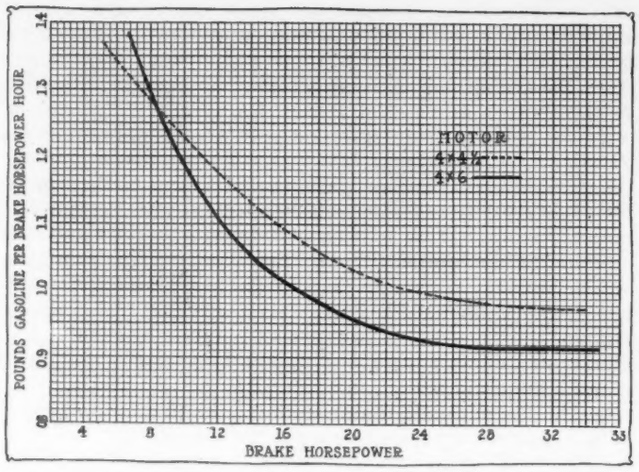


Fig. 2—Relative economy of two motors tested by the Moline company to show comparison between long and short stroke

—1—The price of the car when in the second-hand market depends on its condition in the first place and in the second place upon how anxious the owner is to change it for cash. There have no doubt been second-hand Hupmobiles sold for $250, even in the 1912 models, but the price, as a rule, is above this. This is natural when it is considered that the price of the new car is $750.

2—The cheapest runabout with four cylinders is the Metz. This is a water-cooled car of 22 horsepower with friction drive and sells for $445.

3—This is the fourth year that the Ford model T has been on the market.

4—The price depends altogether on the condition of the car and may range anywhere between $50 for a car which has seen nearly the last of its useful service, and the regular retail price of the car.

5—These parts may be secured from the Auto Parts Co., Detroit, Mich.

Advantages of Long Stroke

Editor THE AUTOMOBILE:—1—What main advantages has a long-stroke motor over the short-stroke type? What advantages has a short stroke over a long?

2—Is the efficiency of an underslung frame greater than that of an overslung? If so, how much and why?

3—How much more brake horsepower will a Knight motor develop than a poppet-valve motor?

4—Is there any difference in the quality and workmanship of a high-priced machine and that of a medium-priced car?

5—Will a six-cylinder motor of the same piston displacement as a four have more power and speed?

6—What is the bore, stroke, clearance and wheelbase of the big six-cylinder American underslung?

Lakewood, O. C. S.

—1—The long-stroke motor is more economical than the short-stroke type. The number of reversals of direction of the piston is less than with the short-stroke motor for a given piston displacement per minute. The motor is more flexible and has a greater reserve power. On the other hand, the short-stroke motor is lighter for the same horsepower, does not require such a high piston speed for a given number of revolutions per minute and gives the snappiness which is desirable in a high-speed motor.

2—There is no difference in efficiency in the drive of the two types of car. The center of gravity of the underslung model is lower than that of the overslung model and hence it is not so easily overturned.

3—This question cannot be answered definitely because it depends too much on the condition of the motor. For the same piston displacement per minute, however, the power developed will be about the same. The big advantage of the Knight motor lies in its silence which is equalled only by the most carefully-designed poppet types.

4—It would not be fair to state that there is better workmanship on the higher priced cars than on the medium. It is a fact, though, that there is more workmanship in parts which are not so essential except for appearance sake. This is in the line of finishing the exterior and castings, etc. It is but natural that when a man pays more for a car he gets his money's worth in time spent in manufacture, material and finish.

5—The six-cylinder motor will have less vibration and a more even torque output. The vibration of the six will be less. Otherwise there will be very little choice. The main advantages of the six-cylinder motor are its sweetness and smoothness of operation.

6—The particulars of the 6-66 American underslung are as follows: Bore, 4.5 inches; stroke, 6 inches; clearance, 12.5 inches; wheelbase, 140 inches, and wheels, 39 inches in diameter.

Removing Carbon Deposits

Editor THE AUTOMOBILE:—Is there any good way in which carbon deposits can positively be removed from the motor without taking it down and scraping? Are carbon removers what they are claimed to be and are the Six Little Yankees as good as the fluid removers?

Woodland, Pa. G. B. SHIVERY.

—There is only one way of positively removing all the carbon from your cylinders. That is by taking down the motor and manually scraping it out. Solvents of liquid nature do not do this any more than do solid solvents of the nature of the Six Little Yankees carbon remover, which you mention. Both of these solvents act in the same way. They are first gasified and the gas dissolves the projections of carbon. A smooth, flat layer of carbon on the top of the piston will not noticeably affect the motor. When a carbon deposit is built up in the form of a cone, however, the point or apex will eventually start to glow and this will result in pre-ignition and a knock in the motor.

Regarding Clement-Talbot Motor

Editor THE AUTOMOBILE:—Kindly answer the following questions regarding the Clement-Talbot racer:

1—How can this car have a compression of (according to your chart) approximately 145 pounds per square inch without causing pre-ignition?

2—Would this high compression be practical for commercial or pleasure cars?

Brooklyn, N. Y. EDGAR YOUNGDAHL.

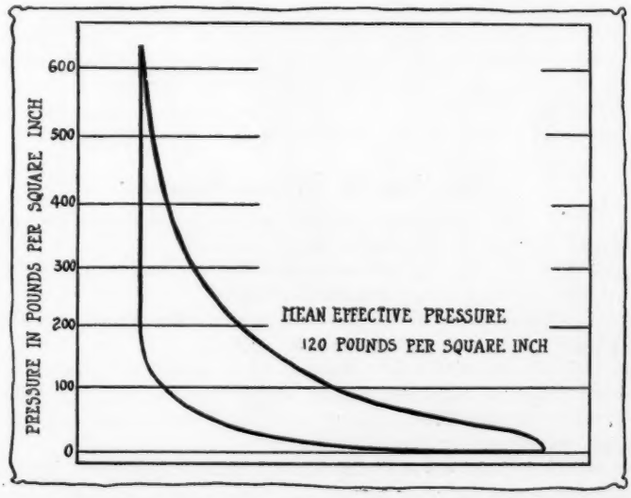


Fig. 3—Indicator card taken from Clement-Talbot motor. Compression pressure is about 120 pounds

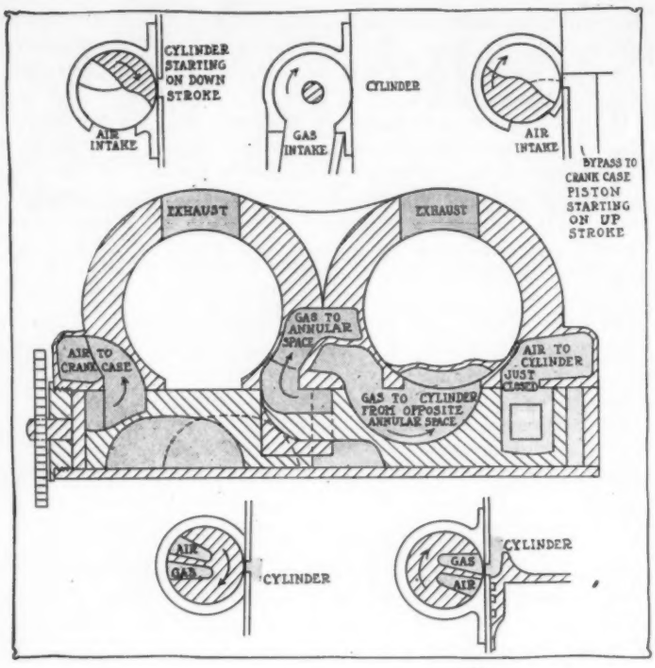


Fig. 4—Two-cylinder scavenging motor in which the gas is compressed in the annular space surrounding the cylinder and the scavenging air is taken from the crank case of the motor

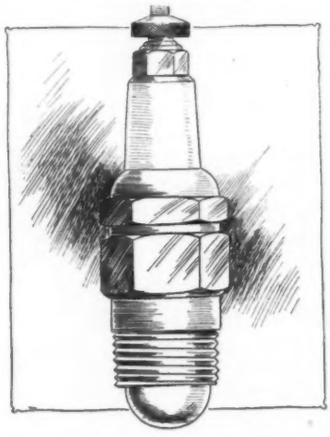


Fig. 5—Spark plug with globular base for which a reader is searching. The electrodes are evidently within the globe or the spark jumps from the rim to the globe

—1—If you will note the indicator card, Fig. 3, taken from the Clement-Talbot motor you will notice that compression pressure is about 120 pounds per square inch. The first part of the upward line being due to ignition or the beginning of the explosion stroke. It is possible to get this compression pressure without pre-ignition.

2—This compression pressure would not be practical for motors used in passenger cars or trucks as it has been found from practice that the efficiency drops off when the compression becomes too high. According to theory, the efficiency would be higher but difficulties in cooling and in getting proper combustion make the theoretical condition hard to obtain in practice.

Questions of Motor Pressure

Editor THE AUTOMOBILE:—What is the highest vacuum in the intake pipe of the average automobile motor?

2—What is the highest pressure of gas compression in the cylinder of the average automobile motor?

3—What is the highest pressure of gas after ignition in the cylinder of the average automobile motor?

4—What relation exists between these pressures? In other words, does a high-compression engine have a pressure after ignition correspondingly higher than usual, and a low-compression engine, etc., and to what degree?

5—What is the usual Diesel practice regarding pressure before ignition and after?

Philadelphia, Pa. J. H. B.

—1—The pressure in the intake pipe of the average motor is generally about 12.7 pounds absolute at average motor speeds or 2 pounds vacuum.

2—The average new automobile motor has a compression of 60 pounds to the square inch.

3—The pressure of the gas after ignition runs up to about 300 pounds to the square inch.

4—The relation between these two pressures is that which would be concluded in a formula which takes in the initial volume of the gas. That is to say, such a formula as $PV^n = a$ constant. In this formula P equals pressure and V the volume. Where the volume remains constant and the pressure rises the total pressure at the end of explosion will not bear a direct ratio to the volume except in that the higher the compression the higher the initial pressure and therefore the higher the mean effective pressure.

5—The Diesel compression pressure is 525 pounds per square inch. The fuel is injected at about 800 pounds and explosion pressure is the same as the compression pressure owing to the fact that this motor expands the gas for a short time under constant pressure.

Suggested Two-Cycle Motor Design

Editor THE AUTOMOBILE:—I have a design for a scavenging two-cycle engine, and would be pleased to have your readers express an opinion as to whether the same is practical or not.

Gas is compressed in the annular space surrounding cylinder, as in the Elmore engine, and supplied to the companion cylinder as the sketch, Fig. 4, indicates, while the scavenging air is supplied from the crankcase, as is also indicated in the sketch.

The distributing valve rotates at the same speed as the crankshaft, and is intended to control the air intake to both crankcase and gas intake to annular space surrounding the cylinder.

This cylinder should be arranged so as to be capable of retarding or advancing its rotation so as to supply more or less of the scavenging air, retarded for light loads and when running fast, and advanced when starting or running slowly to supply a rich mixture.

The question with me is, whether there would be a sufficient time for the transfer of both scavenging charge and mixture to the cylinder. I think it would be necessary under any circumstances to so construct the motor as to develop considerable compression of the gas mixture in the annular space surrounding the cylinder so that it would be transferred to the cylinder with great rapidity, and the volume of this gas should not exceed 80 per cent. of volume of the cylinder.

I have made the suggestion to an engineer of some prominence and he seems to think it is entirely practical, but would require some experimental work and considerable expense before its practicability could be demonstrated. As I have not the means to carry out the necessary experimental work I would like some further opinion regarding the matter.

I am aware that the arrangement of the crank is not conventional in this motor, but could be easily arranged for a crank of the usual type in order to avoid unnecessary vibration. With this type of engine it might be of advantage to control the admission of air from the crankcase by means of a governor so that the air passages would be closed on starting the engine and opened gradually as the speed of the engine increased, in this way performing practically the same function as the auxiliary air intake usually found in most of the carbureters of latest construction.

Grafton, W. Va. R. H. POWELL.

Looking for Strange Plug

Editor THE AUTOMOBILE:—Last summer I saw a spark-plug which I never saw used before and have inquired of about a thousand users and sellers of spark-plugs, but as yet have not found out the maker or anyone that sells or knows anything about one like it. The strange part of the plug is the part marked A, Fig. 5, a half sphere with no holes to let out the

spark and apparently made of mica and neither positive or negative electrodes can be seen from without. There was no name or patent mark anywhere on the plug.

The plug was picked up on the floor of a repairshop and none of the owners of cars that were in the shop at the time knows anything about this freak and I understand the plug has now been stolen so it is impossible to send you the original for identification.

Can THE AUTOMOBILE assist me to find out the name of the maker or where they may be bought?

Trenton, N. J. FRANK C. WRIGHT.

—The plug which you describe, and which is illustrated in Fig. 5, does not correspond to any of the well-known makes on the market. Perhaps one of our readers, seeing this, may be able to help you find it.

Managing Friction Drive

Editor THE AUTOMOBILE:—In driving a car with a friction transmission how is it possible to tell whether same is slipping or not? I understand that to get the best results with this form of transmission there should always be just sufficient pressure between the disk and friction wheel to carry the load without slippage, but do not see how the driver can maintain this pressure which must constantly vary.

2—In the Cartercar the shifting lever cannot be moved until the pressure between disk and wheel is released. Why? I can see no good reason why the wheel conld not be moved along the disk without releasing the pressure. If this could be done it would greatly simplify the handling of the car.

3—Is there any advantage of placing a screen or other device in the inlet pipe for the purpose of better carburetion? If there is anything gained by the use of these devices why are they not more generally used by manufacturers?

4—What size wheels and tires are used on the majority of racing cars?

East Canaan, Conn. D. C. CANFIELD.

—It is possible to tell whether the drive is slipping or not by observing if the motor appears to be running faster than the load, that is to say, when climbing a hill if the motor appears to be running just as rapidly as it did on level road while the car moves forward at a greatly reduced rate of speed, owing to the load. It is true that there should be always just sufficient pressure between the disks to just carry the load, but this is out of the control of the driver and is merely up to the designer. If the drive is not slipping there is no need for you to worry about the pressure between the disks as this has been worked out at the factory before the car was delivered to you. In case the drive is slipping, however, you should write the factory and consult them as to replacing the friction band on the driving disk.

2—It is not reasonable to suppose that where the friction between the driving and the driven member is great enough to propel the weight of a motor vehicle and its occupants at a high rate of speed along level ground and up hills that the operator can readily shift these members in relation to one another. This is especially the case where they are both in motion and where the irregularity of surface of one fits into the corresponding irregularity of another.

3—Tests have been held with these screens and other devices which show better results than without them at certain speeds. This is due to the fact that they break up the gasoline. They are comparatively new and makers have not as yet become convinced of their usefulness. This is perhaps due to the fact that some of these devices were not a success.

4—The size of tires on racing cars depends altogether upon the weight of the car. The 36 by 5 size is very popular.

Explains Ford Magneto Trouble

Editor THE AUTOMOBILE:—In your issue of February 29 a subscriber complains that he had no spark with a Ford model T when the engine was hot. Your answer is that a hot engine is easier to start. The Ford has a flywheel magneto that will get so hot on long climbs in low gear that the magnets are temporarily weakened and the current is too weak to give a good spark.

I have more than once encountered this condition in severe mountain work, but the car will fire as well as ever if given a rest of 15 or 20 minutes. Subscriber's trouble was probably a piece of dirt under the spring at the magnets' terminal.

Denver, Col. J. A. VALENTINE.

To Join Protective Association

Editor THE AUTOMOBILE:—Please inform me how I can join the Gasoline Engineers' Protective Association of New York?

Brooklyn, N. Y. E. H. G.

—Address the secretary at 210 West One Hundred and First street, New York City.

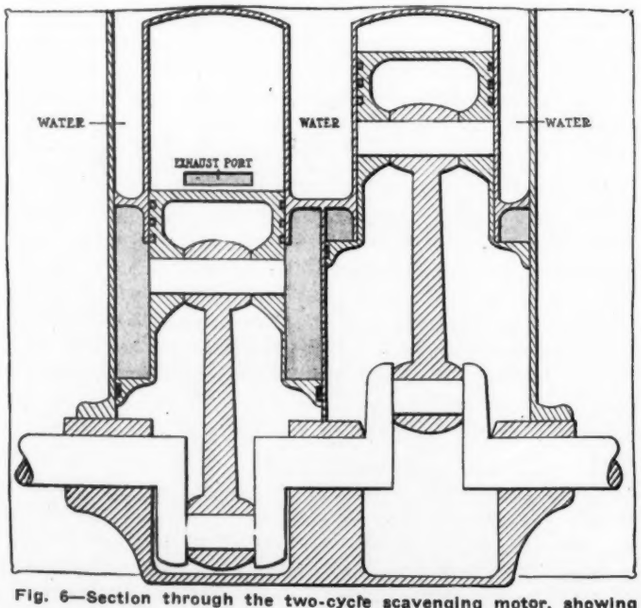


Fig. 6—Section through the two-cycle scavenging motor, showing annular compression space

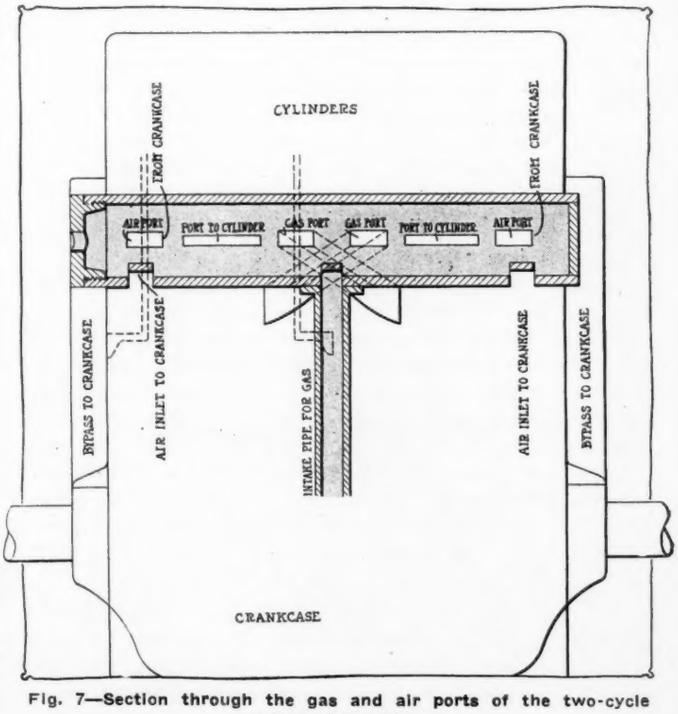


Fig. 7—Section through the gas and air ports of the two-cycle scavenging motor

The AUTOMOBILE

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Utilizing a Profit

AN automobile dealer in a large American city recently made the astounding confession that, although purchasing gasoline wholesale at 10 cents a gallon and retailing it at 20 cents, he was not breaking even. It is nearly impossible to conceive of such a condition, remembering as we must that the gasoline was delivered into his storage tank underneath his garage, so that all he was compelled to do with it to make his profit was one handling, namely, from the storage tank into the tank of the automobile.

Where did the profit go? There are divers answers. Cheap help, susceptible to favoritism from buyers, accounts for part of the profit. Over-measure was given to many, and under-measure to a few. The system of handling was poor. The pump on the storage tank was not locked. Every time a little gasoline was needed for any purpose a small pail or can was taken to the pump. It was half filled, perhaps filled, and often little over a cupful used. The ramifications of such waste are many. It was waste in one place and waste in every place.

All he lacked was business training. He thought that enthusiasm was all that was needed. He had this, but had little else. This is a business generation, and only the dealer who conducts his business on legitimate, up-to-date lines can continue in the field.

Raising a Revenue?

A FEW New York State legislators are endeavoring to double the annual registration tax on automobiles and to make the tax on commercial vehicles as much for each ton of useful load carried as it is to-day for the entire truck. These same legislators advance as their only argument the solitary fact that automobiles and motor trucks destroy the road surface and as such they should pay the bills. In the same breath they say that taxation on vehicles should be in proportion to the amount of road destruction, and yet they let all horse vehicles go without any taxation, and while endeavoring to double the motor vehicle fees continue to keep away from taxing horse vehicles as consistently as ever.

This condition of affairs is not a new one, it is well understood by all. It was well understood three years ago when the present Callan law was accepted by the motorists, who, when accepting a state registration tax, realized that such a tax was illegal except insofar as it was needed to cover cost of identification. It was accepted by the motorists three years ago because of their desire to co-operate with the legislators in obtaining a rational working law. The motorists were willing that excess registration fees should go to the road improvement work. The legislators accepted the matter in this spirit. In a word, it was a gentleman's agreement and as such it would naturally be expected that its conditions would be observed.

Today, what is becoming of this gentleman's agreement?

Doubling present taxes on passenger vehicles and multiplying them on commercial vehicles is not the treatment that the automobilist of the state deserves and treatment that the automobilists of the state will not accept. The facts convincingly indicate that more revenue is needed, and taxing the automobilist seems an easy avenue of attainment.

Every automobilist in New York State should resist such a course—class taxation. Levying on one class of vehicles because it wears out the highway and letting all other go free.

No better evidence of the new spirit of this generation could be given than the unanimity with which the entire automobile ranks of the state united to counteract such unjust taxation a week ago at Albany. From every corner of the state came the motorists, the farmer-driver sitting side by side with the banker, the lawyer and the merchant and all agreed on the injustice of such taxation. Not only did these motorists come hand-in-hand and fight side-by-side, but they are prepared to combat to the bitter end. They are prepared to take up the only proper course, determine the constitutionality of such a law in the courts. New York automobilists have set an example for the motorists of other states, an example that should be spread country-wide. The motorist does not wish to avoid taxation, but he objects to unfair treatment. He objects to paying it all. Tax every vehicle for the use of the highway in just proportion to the damage done and all will be satisfied. Compel all classes of vehicles to carry lights and to obey the regulations and there will be no dissatisfaction.

S. A. E. Hears Rim Manufacturers in Cleveland

Makers Answer Questions Relating to the Adaptability of Their Rims to Wire Wheels, Etc.—Indiana Section Meets

CLEVELAND, O., March 12—The hearing of rim manufacturers before the pneumatic rim division of the standards committee of the Society of Automobile Engineers was completed here this evening, and owing to the dispatch of the business by Chairman Henry Souther it was possible to complete the collection of data on each type of rim submitted. The meeting was in the nature of a hearing conducted by the special committee to which fifty pneumatic tire, wheel rim, steel band and motorcycle companies were invited to attend and explain their products. About thirty-five rim makers and others interested were in attendance, while ten manufacturers availed themselves of the opportunity to present samples of their rims. Of course, there are many more well-known rims which will have to be seen by the committee, but a very good start was made.

There were three types of rims which were never before exhibited anywhere, these being the new No. 60 Stanweld, which is a light demountable of the split-ring type; the Midgley rim, which is fathered by the United States Tire Co., and a new Goodyear quick-detachable design.

Valuable Data Collected

Each maker was questioned as to the weight of his rim, whether it could be sold in competition, how it withstood service, method of operation, number of loose parts, its adaptability to wire wheels, whether the standard dimensions of the clincher tire association has been adhered to and whether it could be manufactured in any mill without special machinery. Other special questions were put in order to bring out as far as possible every point and feature of every type considered.

Following the explanation of the Standard-Welding quick detachable, which was the last of this type submitted, the afternoon session confined itself to the demountables, which are the biggest consideration of the committee, there being such a wide divergence of meritorious designs.

In addition to the questions asked of the quick-detachable exhibitors those who showed demountables—of which there were ten—were also asked as to the distance between the supports of the outer rim, whether these had any relation to the position of the spokes, as to the waterproof qualities, whether the rim would squeak in extended service, etc.

Much valuable data were collected on each type, and the quizzing of the committee members was assisted by that of the other experts in attendance but not on the committee. Criticisms offered by the latter as to contemporaries' offerings were often edifying to the division.

Nothing whatever was decided at this hearing, it being entirely for the purposes already brought out. The minutes will be gone over carefully in the Society's offices in New York and the data relative to each make will be digested and put in uniform style for the ready reference of the committee.

In closing the hearing, Mr. Souther stated that great amount of information obtained made it very evident that more time was needed by the committee and each rim concern was requested to send its samples to the Society offices in New York in time for the next meeting. In the event of any companies not being able to furnish its exhibits to the committee there, it was requested to at least send blueprints or sketches. The exhibits can be sent at any time.

Mr. Souther assured all that prompt and intelligent action would be taken by the committee and its findings reported as soon as possible.

Following the hearing the committee held a short session to determine just what method of procedure to follow in rounding up the rest of the necessary information and taking care of that already obtained. It was decided to hold the next meeting on April 2 at the New York headquarters.

The concerns having exhibits of demountable rims at the meeting were: American Rim Co. (Lambert), Anglada Co. (Parker No-Felloe), Detroit Demountable Rim Co., Firestone Tire & Rubber Co., R. W. Funk, Goodyear Tire & Rubber Co., Standard Welding Co., Universal Rim Co. (Baker), United States Tire Co. (Midgley). The Mott Wheel Works did not have a sample to exhibit, but by means of blackboard sketches O. W. Mott explained it to the committee. Several other representatives were on hand, but when called upon stated that they had nothing to say or to show at this time.

As reported briefly in THE AUTOMOBILE last week, this rim committee, which was formed at the last semi-annual meeting of the Society, is made up of men who are the recognized authorities on the subject of automobile rims, as well as several prominent engineers. There has been some criticism of the appointment of several of the rim makers on the committee, but it was shown to be desirable to have such experts, for their specialized knowledge of this particular part of the automobile's makeup is invaluable. It would have been a rather noticeable feature if none of these men had been included in the personnel of the division. The number of rim makers is in the minority, however.

The committee is made up as follows: Henry Souther, consulting engineer, chairman; H. L. Barton, assistant director of production, General Motors Co.; G. G. Behn, executive engineer, Hudson Motor Car Co.; T. W. Guthrie, secretary, Standard Welding Co.; F. H. Moyer, experimental engineer, Firestone Tire & Rubber Co.; C. E. Reddig, engineer, Timken-Detroit Axle Co.; W. C. State, mechanical engineer, Goodyear Tire & Rubber Co.; J. G. Vincent, chief engineer, Packard Motor Car Co.; C. B. Whittelsey, factory manager, Hartford Rubber Works Co.; C. B. Williams, treasurer, Mott Wheel Works. Of this committee three members were not in attendance at yesterday's meeting. These were J. G. Vincent, H. L. Barton and W. C. State, who were unable to appear due to other business matters. E. R. Hall, manager experimental department, Goodyear Tire & Rubber Co., substituted, however, for Mr. State.

Indianapolis Section Talks Fuel

INDIANAPOLIS, IND., March 14—The March meeting of the Indiana branch of the S. A. E. was held Monday evening, March 11, in a joint session with the Hoosier Motor Club. The question discussed was Motor Fuels. A paper by A. M. Potter was read by Mr. Tipper, chief chemist of the Texas Coil Company. One of the points brought out in the discussion was that the fuel value of the gasoline cannot be determined by the gravity of the liquid. It was also stated that the increasing demand for gasoline must be met by using some of the kerosene distillates, and that in using kerosene as a fuel it is simply a question of getting the correct temperature to prevent condensation.

Pneumatic Suspension for Varying Load

ONE of the difficulties associated with the use of leaf springs as a means of suspension for automobiles has been the necessity of providing for a varying load. If a car always contained its full complement of passengers the problem of the correct proportioning of the springs would be much simplified. As it is, the variation of load, necessitating a design of spring that is supposed to meet all requirements, means that at no time is the suspension of the strictly correct strength.

Attempted solutions of this problem, in the form of shock-absorbers and auxiliary springs, are numerous, more or less satisfactory results accruing to several of them. But even in the case of the best it is generally felt that there is still room for considerable development before the ideal suspension is realized.

In this connection the pneumatic principle seems to offer possibilities to which, apparently, insufficient attention has been given. There are, however, several experimenters in the field. One of these, the Cowey Engineering Co., London, England, has, after trials extending over 2 years, brought its product to a state of practicability.

The Cowey device is not so much an auxiliary fitting as it is a complete suspension system. It consists of four air cushions applied to the rear ends of all four leaf springs, as shown in Fig. 2, and supplied with compressed air from a small reservoir conveniently located on the chassis. The feature of the system is that the pressure in each of these cushions or cylinders is made to vary exactly with the load borne by that particular corner of the car at any time.

A section through one of the air cylinders, Fig. 1, shows the method of attaching to the chassis and also the connection existing between the device and the end of the spring. Each unit consists essentially of a plain cylinder vertically arranged on a bracket fixed to the frame and opening at its upper end into a compression space having the appearance of an ordinary water-jacket. The lower end is open to the air. A piston provided with a well-oiled leather cup on its upper surface, constituting an absolutely air-tight joint, is free to slide within the cylinder. The piston rod or compression member between the piston and the spring is shackled only at its lower end, the other end simply resting in the recessed under surface of the piston.

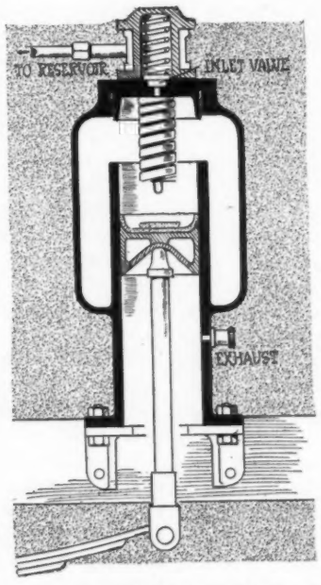


Fig. 1—Section through one of the air cylinders which are bracketed to the side members of the chassis

At the top of the cylinder casting a spring-loaded inlet valve is in direct communication through small copper piping with the air reservoir, as shown in Fig. 2. The plunger rod of this valve extends downwards toward the piston and is surrounded by a buffer spring, the lower end of which meets the piston when the latter is in its highest position. A small hole drilled in the cylinder wall, and forming an exhaust port, determines the lower limit of the piston stroke.

The air reservoir is supplied direct from a simple non-return valve fitted to one of the valve caps of the engine. By this means the pressure of air in the tank is maintained so long as the engine is running. This pressure is such that the automobile is supported on the four air cushions with the pistons occupying a normal position, as shown in Fig. 1.

Assuming this to be the case, and the car traveling over the road, the following action takes place: When an inequality of the road surface is met the piston is caused to move up or down and if the bump is severe enough the upper surface of the piston either strikes the plunger rod of the inlet valve, or, on the other hand, drops low enough to uncover the exhaust port. In running the car with the rear seat empty, then, immediately a person enters, that side of the car on which he is seated sinks a little over the piston. This action brings the upper surface of the piston near to the valve rod so that with each ensuing lump in the road surface a small quantity of air enters until the piston is again occupying its normal mid-stroke position. When the passenger gets out, the pressure in that particular cylinder, being too great, raises that corner of the car so that the piston approaches its lowest position in the cylinder. The first inequality then encountered frees a portion of the air through the exhaust port, and so allows the piston to return to its normal position.

For information respecting this system of suspension we are indebted to our contemporary, *The Motor*, England.

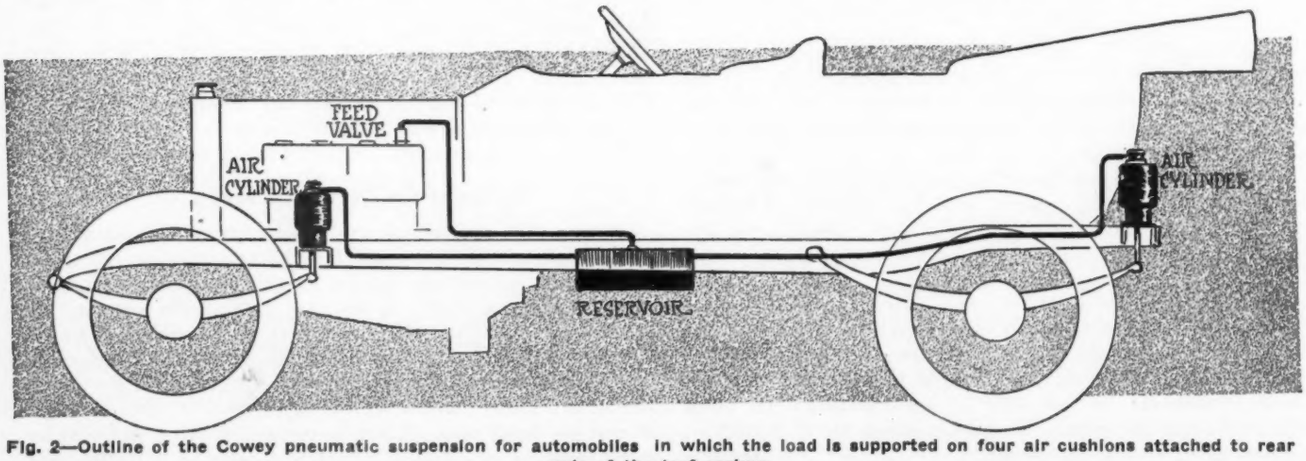


Fig. 2—Outline of the Cowey pneumatic suspension for automobiles in which the load is supported on four air cushions attached to rear ends of the leaf springs

Garage Men Protest Against Separators

Regulations of the Municipal Explosives Commission

Article XI

¶ *Sec. 376. No garage permit authorizing the storage of volatile inflammable oil shall be issued for any premises which are not provided with an oil separator, trap or other similar apparatus attached to the house drain for the purpose of preventing volatile inflammable oil from flowing into the sewer; provided, however, that the Fire Commissioner, may, upon recommendation, exempt from these requirements a garage drainage into a short sewer line.*

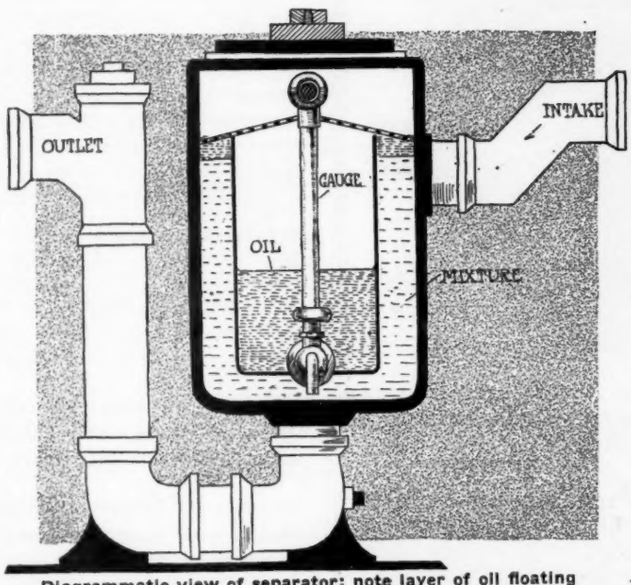
¶ *Sec. 396. Each oil separator installed in a garage shall be connected to the house drain, and shall be so arranged as to separate all oils from the drainage of the garage.*

¶ *Sec. 397. The oil receptacle of an oil separator shall not exceed 50 gallons capacity, and shall be emptied as often as may be necessary to prevent the oil from overflowing; and such oils as are recovered from the separator shall be removed from the garage within 24 hours after being taken from the separator.*

¶ *Sec. 398. All oils spilled on the floor of a garage shall be removed by sponging or swabbing, and poured into the drain leading to the oil separator.*

NEW YORK CITY, March 18—There are three sides to the garage separator situation as it now stands in New York City. First, there is the law which is printed on this page; second, there is the garage man who protests against the expense; third. there is the separator manufacturer who has to make a separator good enough to comply with the wishes of the fire department and cheap enough to suit the pocketbook of the garage man.

The presence of inflammable gas in the sewers of a city is a menace to its population. If it is possible to have an explosion in the sewers of the city, powerful enough to hurl manhole covers high into the air with a reasonable chance of falling on the heads of passing pedestrians or playing children there is something wrong. The fire department is responsible for street explosions. It is the business of the Municipal Explosives Commission to minimize the dangers of these explosions by doing everything possible to prevent them. For this reason they have passed the law requiring the garage to be provided with a separator.



Diagrammatic view of separator; note layer of oil floating on top of water. Separation takes place in large tank

The average garage man is no plutocrat. The sum of $300 extracted from his receipts strikes him a blow in a spot which affects him most seriously. The law must be obeyed or the fines amount to more than it would cost to install a separator. There is only one course to take in a matter of this kind. That is to combat the law and this is now being done.

The garage owners of New York City have combined and have an attorney who represents the entire organization. A test case has been carried into the courts and it is upon this that the matter now rests. There can be no doubt that the decision of the court in this case will decide the future of many of the small garage men who have great difficulty in making their business pay. If the device were cheaper, there can be no doubt that the garage keepers would have installed them without protest. Most of the larger garage owners have done so now.

The separator manufacturer is between two fires. He must meet the severe requirements of the Municipal Explosives Commission and he must meet the pocketbook of the garage man.

The fire department tests each installation separately. There are in New York four concerns which manufacture separators for garages. Each of these has a number of installations in reputable garages in the city and each has passed the individual test which consists of stirring together about 10 gallons of gasoline, lubricating oil, grease and dirt with about 50 gallons of water and pouring it down the drain pipe. Several samples are then taken at the separator outlet and tested for inflammable volatile matter. The principal test given the sample is the flash test. If it is possible to get a flash from the sample, the separator is condemned and a license refused until the separator meets the requirements.

These tests are made in the presence of an official from the Municipal Explosives Commission and are absolutely individual. There is no such thing as an accepted type of separator which stands alone on the merits of the manufacturer. It has to be tested while actually in place and has to meet requirements that are far more severe than found in ordinary service.

When the separator has passed the test a letter of the following form notifies the garage owner to that effect:

FIRE DEPARTMENT OF THE CITY OF NEW YORK
Office of the Commissioner

NEW YORK, March 4th, 1913.

AMERICAN LOCOMOTIVE WORKS,
630 Jackson Ave.,
Long Island City, N. Y.

SIRS:—You are hereby notified that the oil separator of the ..... type installed at premises 630 Jackson Avenue, Long Island City, and known as the American Locomotive Works Garage, has been approved, as upon examination and test of sewage it was found not to contain volatile inflammable oil.

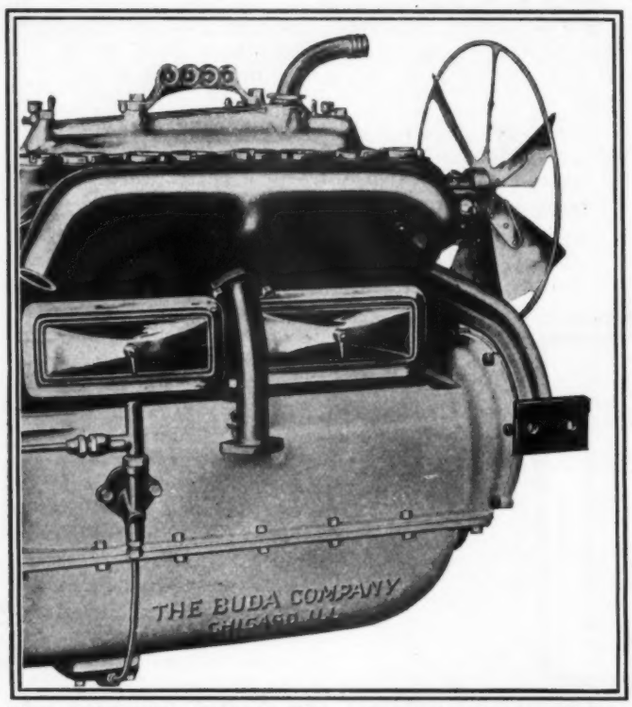
Respectfully,
WILLIAM GUERIN,
Acting Chief, Bureau of Fire Prevention.

The separators all operate on the principle shown in the accompanying sketch. The water passes through the outlet, leaving the layer of oil floating on the water to drop into the separating tank.

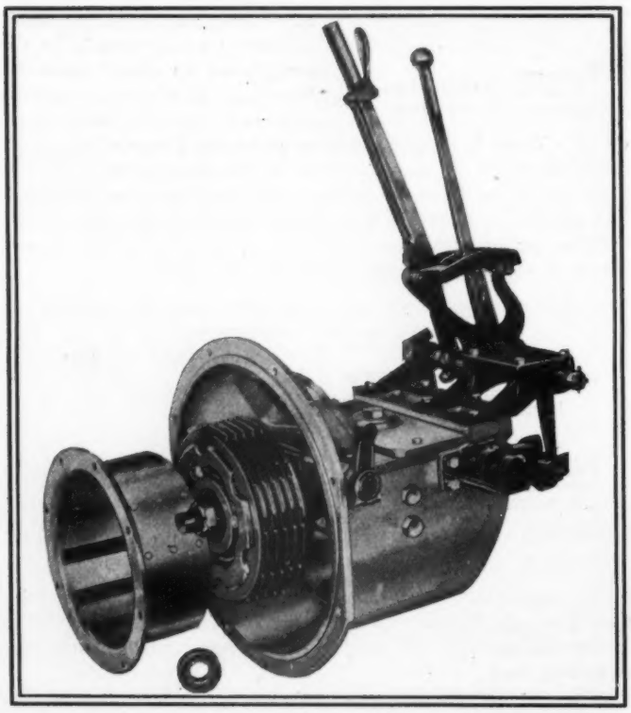
Before installing a separator the garage man must furnish the fire department with complete detailed information regarding the separator and his plans for installation.

New Tribune Car To Have Left Drive

Center Control Will Also Be a Feature—Four-Cylinder Block Motor of 35 Horsepower—Car Will Be Assembled



View of the right side of the Buda motor used in the new Tribune car, showing valve cover plates and manifolds



Multiple-disk clutch disassembled, showing the method of inclosing the parts as well as the shifting levers

DETROIT, MICH., March 17—A little over a week ago several Detroit business men, headed by L. G. Hupp, organized a new concern in the passenger car field, known as the Tribune Motor Co. This week THE AUTOMOBILE furnishes a description of the Tribune car, which is to be entirely an assembled proposition.

The principal features will include left drive, center control and a 35-horsepower block motor, having a bore of 3.75 inches and a stroke of 5.5 inches. This motor will be used in connection with a unit power plant. It is of Buda make, of L-head construction, the valves being all located on the right side and inclosed by two easily-removable cover plates. It has a three-bearing crankshaft with long, light pistons and long connecting-rods of I-beam section. Each piston is provided with three compression rings, while the connecting-rods are fastened to the crankshaft by four-bolt straps. The camshaft is integrally constructed and mounted on three bearings. The tappets are of the mushroom type and provided with adjustments.

The principal bearing sizes are as follows:

Crankshaft bearings	Length, inches	Diameter, inches
Front	3.125	1.75
Center	2.5	2.
Rear	4.	2.125
Connecting-rod bearings	2.375	1.875
Camshaft bearings:		
Front	2.9375	0.875
Center	1.5	2.
Rear	2.25	2.
Valve Diam.	1.875	.....

Both the crankcase and the oil pan are made of aluminum, the flange for the clutch housing connection being cast one-half integral with each half of the crankcase.

Grease Cups in Bolts on Rods

Lubrication is by force feed, the constant-splash level system being employed. All spring bolts, radius-rod bolts and torque-arm bolts have a grease cup at the head which forces grease through a hollow core in the bolt to the wearing surface.

Magneto and water pump are located at the left on brackets provided for them, which are cast as parts of the upper half of the crankcase. This part also has cast integrally with it the four arms which attach to the frame and support the motor. Timing gears and magneto and pumpshaft gears are conventionally inclosed by an aluminum cover plate at the forward end of the motor. Due to the block construction, the various manifold connections to the castings are short, one inlet gas connection and one inlet water connection sufficing. There are three openings into the exhaust manifold, however.

The ignition is by means of a high-tension magneto of the dual type, employing the Bosch style of spark-plug. The make of carbureter has not yet been decided upon.

The gearset, which is to bolt to the rear of the crankcase through a flange, is of the Brown-Lipe make. It has three forward speeds and reverse and center control levers. The gears are all mounted on Timken bearings, the sliding gear-shaft being splined. This is in every way a standard Brown-Lipe construction and includes a multiple-disk clutch, alternate plates of which are lined with Raybestos, which can be run either in oil or dry. The gears are of chrome-nickel steel. The gear ratios provided in this gearset are given: High—1 to 1. Medium—1.76 to 1. Low—3.35 to 1. Reverse—4.32 to 1.

Standard Timken front and rear axles are used, the former being of the floating type with five-pitch bevel gear and pinion.

The driving gear is riveted on the differential case, following the usual Timken practice, while the housing is of pressed steel. A grease retainer is provided in the shape of a tube extending from the brakes to a point close to the differential. The usual removable cap at the rear of the housing is provided for accessibility to the transmission gearing.

The steering gear is a Gemmer type S unit, having a worm and gear with ball bearings. The wheel is 17 inches in diameter.

There are two sets of brakes, external contracting, operated by pedals, and internal expanding, operated by a ratchet hand lever. There are 320 inches of braking surface, the brakes being 14 inches in diameter and 2 inches wide. Pedals are adjustable to the leg reach of the driver. A large register is placed in the toe board for heating the car in cold weather.

The frame is of the usual channel section with a single drop and braced by three cross-members, having integral reinforcing gussets at the corners. The springs are half elliptic in front and elliptic in the rear. The sizes are as follows:

Wheels are of second-growth hickory, having 1.5-inch spokes. Twelve spokes are used and six holes in the hub flanges on both front and rear wheels. Wire Wheels will be supplied, if the purchaser desires them, for an additional charge.

Front—37 inches by 2 inches. Rear—42 inches by 2 inches. The rear springs are hung directly under the rear frame cross member and underslung to the axle by means of two-piece swivel seats. The tire size is 32 by 3.5 inches.

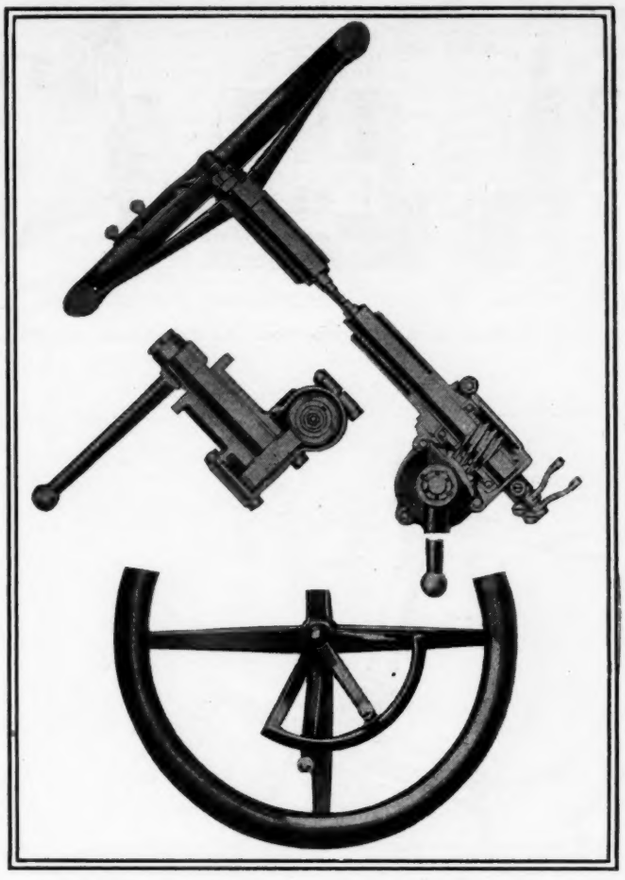
Touring Body Is Very Roomy

Looking at the touring body, which is the only style to be fitted at present, we find a very roomy design. The front seat is 41 inches wide, while the space between the front of the cushion and the dash is 30 inches. The rear seat is 47 inches wide and the distance from the front edge of the cushion to the back of the front seat is 28 inches. The gasoline tank is located under the front seat and has a capacity of 10 gallons. An 8-gallon emergency tank is placed under the cowl. The road weight of the car with the full equipment is given as 2300 pounds. The wheelbase is 116 inches.

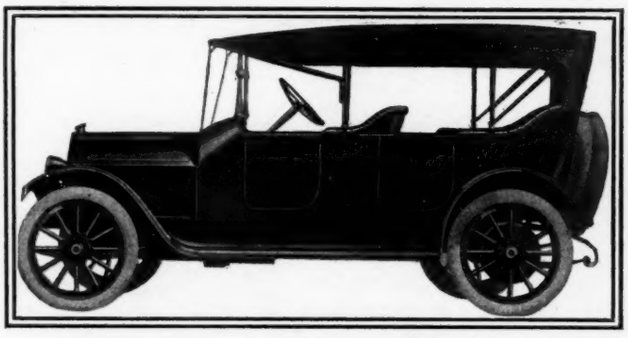
The idea in having the fenders follow the contour of the front wheels, as shown in the illustration, to the running boards is to provide ready access to the motor and other parts under the hood.

Perusal of the body shown herewith will reveal the fact that there are no side lights, which is a rather unusual feature. The head lights are so constructed as to make side lights unnecessary. In each lamp are placed electric bulbs of two sizes, the smaller to be used for city driving, and the larger being used for road work. Current to either of these two sets of lights is controlled from the driver's seat.

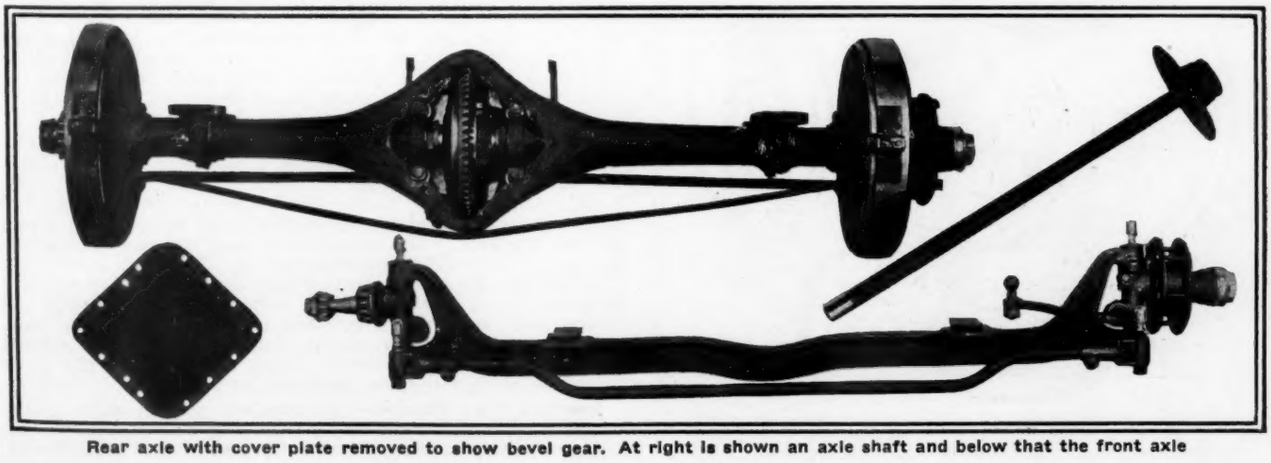
The equipment includes top, windshield, curtains, speedometer, electric horn and demountable rims, in addition to the usual complement of tools, robe and foot rails, and so on.



Details of the steering gear used on the Tribune car

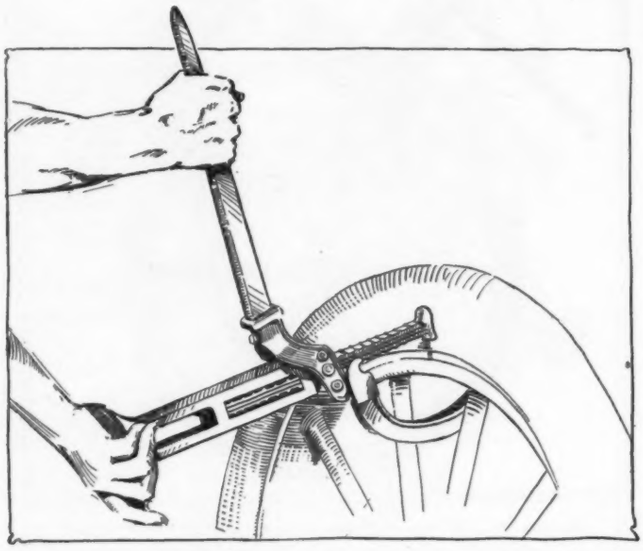


The Tribune is made only in the touring type at present

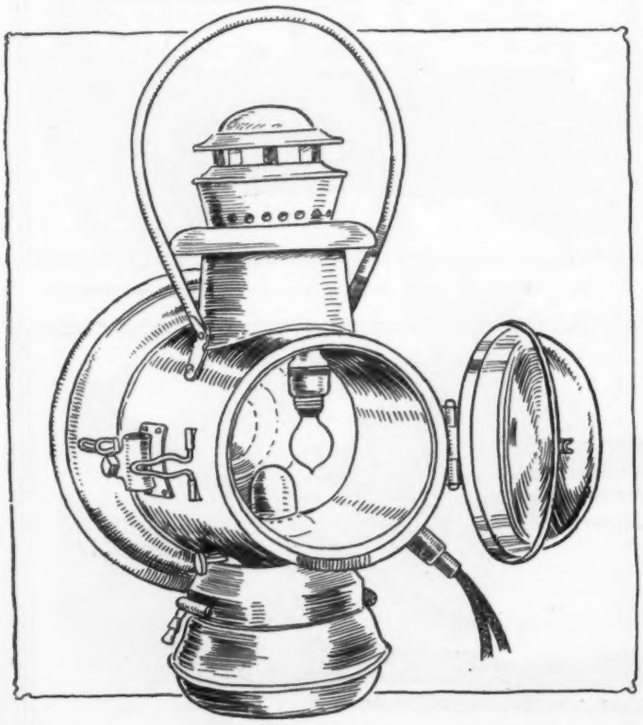


Rear axle with cover plate removed to show bevel gear. At right is shown an axle shaft and below that the front axle

Sketches of the Driver lamp, the Tremo horn and the New Era tire which were represented at the recent shows



Peerless jacks, besides elevating automobiles, may be applied for removing tires



The line of Ham lamps is adaptable for the use of either oil or electricity

Show Accessories

Part II

THERE were so many accessories shown at the recent big exhibitions at New York, Chicago and Boston that it was impossible to describe them in the show issues of THE AUTOMOBILE. A number of them, each of which is illustrated, are taken up herewith:

Driver Lamp—These lamps are made in such manner that the bulbs cannot be stolen, cannot rattle and do not require polishing. They may be used for side or tail lights and operate on a 6-volt cell. The tail lights are so designed that they are operated from the rear of the car to comply with the Illinois state law and similar laws pending in other states whereby it is required to control the tail light from the rear. They are sold by the Standard Auto Supply Co., Boston, Mass.

Tremo Horn is designed for Ford cars and is operated by the exhaust. It is fitted to the exhaust pipe of the car by clamping the horn-shank directly to the pipe. It can be attached in a few moments. The horn is operated by a pedal which opens a flapper and allows the exhaust to be blown across the mouth of the whistle. A feature of the horn is that it can be blown when the motor is throttled down as well as when it is operating at higher motor speed. It is made by the D. Henry Bonner Company, Cambridge, Mass.

New Era Springs are made to fit standard makes of cars, and can be furnished in any desired color. They replace the original spring in case of breakage. They are made of high-carbon steel and of such quality that it would be more satisfactory to buy the complete spring than to risk the type generally made by local blacksmiths who use as a rule a low-grade carbon steel. A large assortment is carried in stock and springs may be secured at short notice. They are made by the New Era Mfg. Co., Waterbury, Conn.

Peerless Automobile Jacks—The Oliver Mfg. Company, Chicago, Ill., manufactures jacks for automobiles. The Peerless jack is very practical in that it may be used in tire removing as well as jacking. It consists of a jack support, a curved base which digs into the ground preventing tipping of the jack, a hollow-swivel top and a handle. One of the most important features is the attachment for loosening and removing tires. This attachment is a bracket, which is hooked onto the jack, when the latter is to be used for the work of removing tires, and placed between the spokes to push the tire off, or over the tire to pull it off.

Ham Adaptor Lamps—The C. T. Ham Mfg. Co., Rochester, N. Y., manufactures automobile lamps. They are so constructed that oil or electricity may be used. The bodies are made of heavy brass, riveted throughout and reinforced with steel plates on the sides to take the strain on the brackets. The electrical device is suspended inside the lamp in such a manner that it clears the oil burner completely. By this system of adjustment, the electric light is in full focus of the reflector without interfering with the oil burner. It is wired between the cylinders of the lamp and connected to a permanent plug fastened to the outside of the lamp. All the other lamps are built on the same principle, with the same construction.

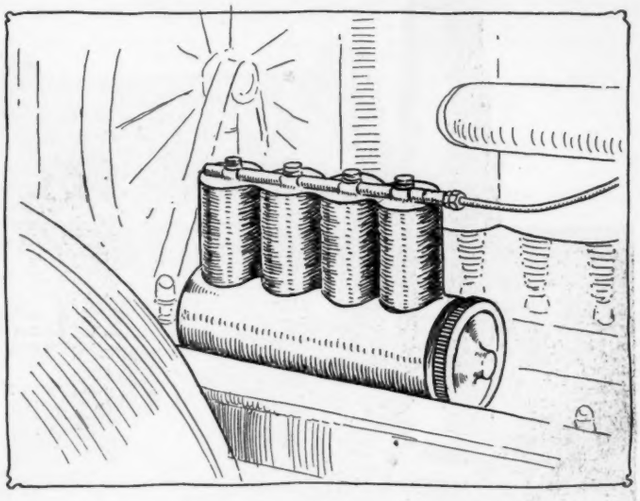
Peerless Tire Pumps—The Peerless four-cylinder pump, which may be driven by hand, engine and an electric motor, is manufactured by the Peerless Accessories Manufacturers,

Chicago, Ill. It is built as a four-cylinder pump. It is finished in black enamel, with nickel trimmings. The pump is equipped with a dial-pressure gauge which shows the steadily increasing pressure in the tire as the pump is operated, either by hand or power. There is no danger of overinflating as the gauge shows the exact air pressure in the tire at all times. The hose connection automatically opens and closes the valve in the tire. The pump is mounted under the hood or footboard and is driven by gears or chain from some exposed shafting on the engine or transmission. It is operated by a knob which together with the gauge is mounted on the dash. The Peerless four-cylinder hand pump turns with a crank and is clamped to the running board in a few seconds. The portable electric pump for garage purposes is very light. It is of the same construction as the engine-driven type. There is a gauge on the top of the pump which shows the air pressure in the tire. It can be moved to any part of the garage and attached to ordinary light sockets.

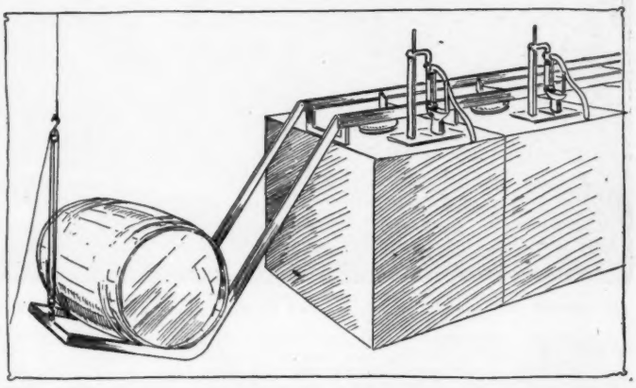
Wallmann Fuel Tanks—The Wallmann Mfg. Co., Milwaukee, Wis., manufactures oil-storage systems for factories, garages and stores. The Wallmann system No. 12 is made for the private garage. It is made of heavy galvanized steel, riveted and soldered to make it absolutely airtight. It is painted with rustproof paint and tested by air pressure before it is shipped. The filling pipe is 2 inches in diameter and has a vented double valve-cap with a hinged hasp which can be locked. The lubricating outfit, No. 14, is of the same construction as No. 12, but its use is for lubricating oils, paints and other non-explosive oils; it may be placed on the floor of a room with a gauge showing the quantity of oil in the tank at any time. A combination storage outfit is also made, containing five separate tanks and pumps, with an arrangement for raising barrels for the purpose of filling the tanks. The company also specializes in accessories pertaining to the storage of gasoline, such as pumps, buckets and funnels.

Barco Exhaust Signals—The Barco Brass & Joint Co., Chicago, Ill., manufactures the Barco chimes and valves. The chimes are attached to the exhaust pipe and operated by the valve attachment manufactured by the company, by means of a pedal at the footboard. The mechanical features of the exhaust valve are that it gives an unobstructed passage when the valve is open, and does not cause back pressure. It closes the horn outlet tightly and throttles the tone perfectly. The valve is self-cleaning. It consists of only three parts. The chimes are made of brass with an aluminum core. The method of installation is by sawing a section out of the exhaust pipe between the engine and the muffler and slipping the valve on with the proper end toward the engine.

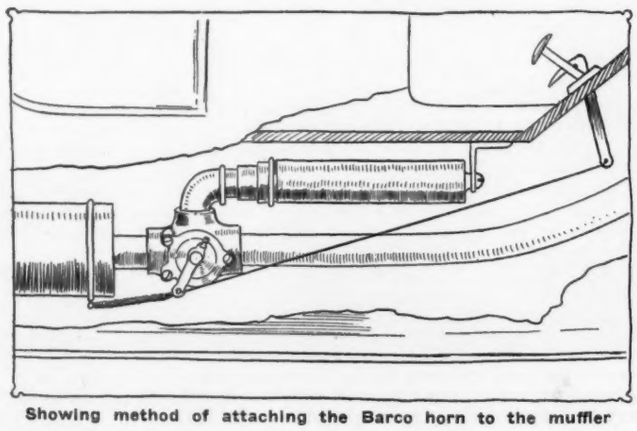
Universal Tire Sundries—A tire tread and a few types of repair boots are being manufactured by the Universal Tire Protector Co., Angola, Ind. The Universal tread is made from a heavy quality of chrome tire leather, extending from rim to rim, averaging approximately 7 gauge, and upon this body are mounted a traction armor and reinforcement. This armor attachment is built up separately of two and three-ply leather specially prepared. This in turn is mounted upon the main body with four rows of heavy flat-head rivets, which are the only rivets passing through the main body. This construction leaves the inside surface of the tread perfectly smooth and free from rivet shoulders. The tread is locked on the rim by a pair of double-end locks on each side of the tread, providing four points of adjustment on each side. The connection and adjustment of the tension bands is accomplished by a separate, self-retaining connecting lug for each point of adjustment. The tension is made with a strong tool for the purpose. The Junior adjustable inflation boot is a new product. The new repair boot consists of specially designed double-loop, double-studded felloe grip. It is made with two pairs of 1.5-inch anchor straps riveted to the edge of the boot, under the side plates. The boot is placed over the deflated tire, the anchor straps are adjusted in the felloe grip and then the tire is inflated. There are two other repair boots manufactured by this company, a plain clincher and an armored-clincher type. These, like all the others, are made with the rigid, curved side plate, conforming the boot to the shape of the tire and furnishing the rigid support along the rim line.



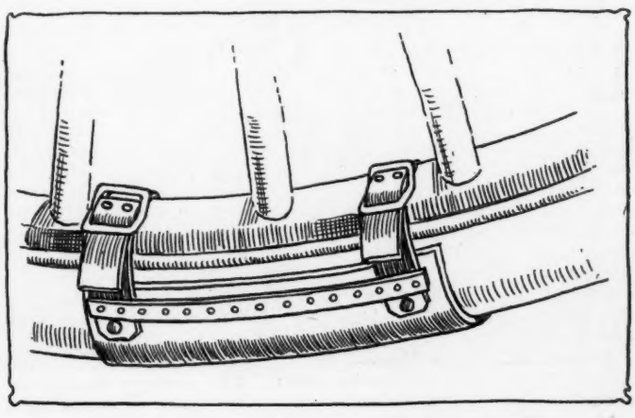
One method of installing Peerless tire pumps on a car



Wallmann outfit for the storage of oil and gasoline

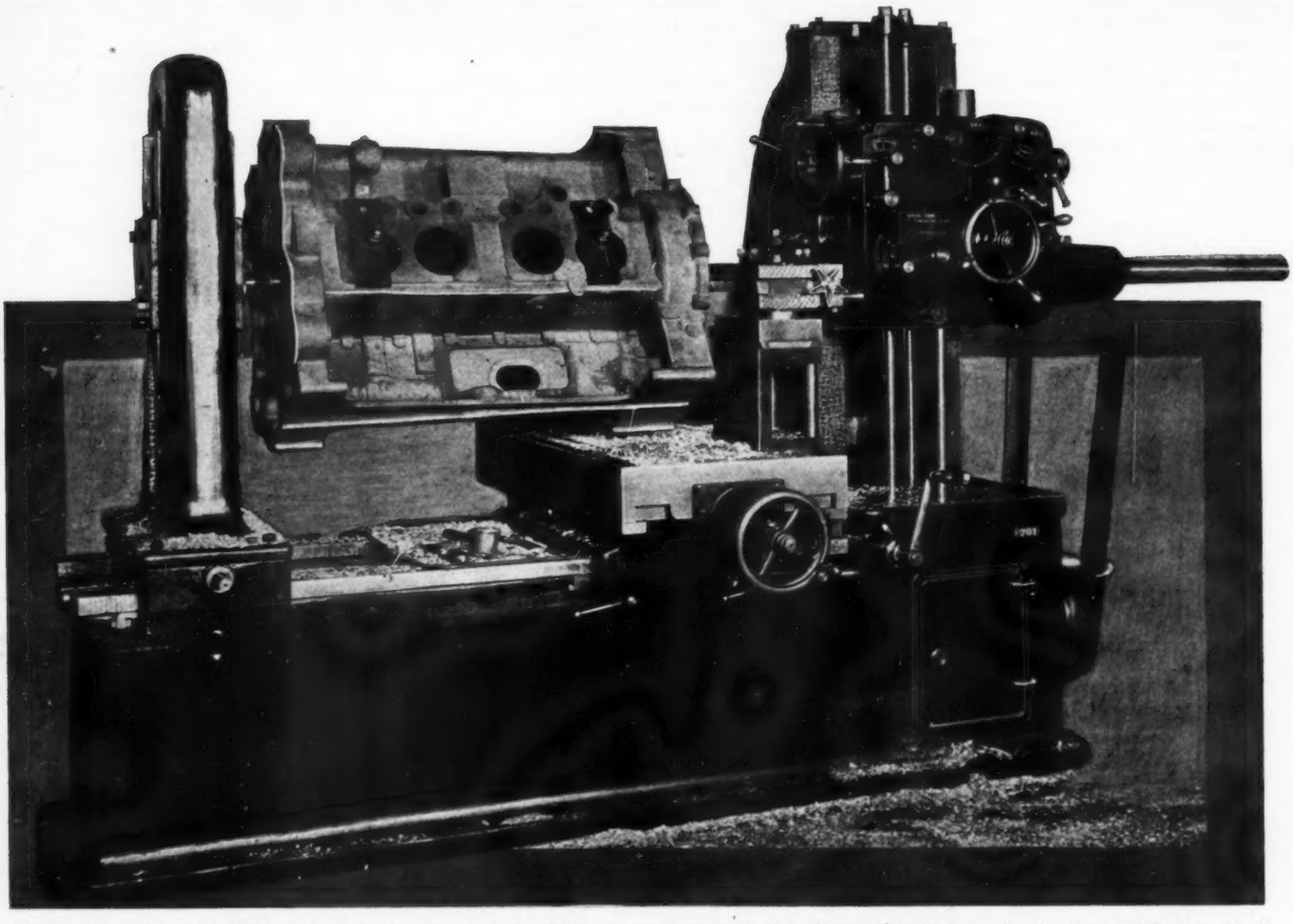


Showing method of attaching the Barco horn to the muffler



One of the repair boots of the Universal company

Factory Miscellany



Horizontal boring mill which is used in the boring and milling of crankcases in Jas. Cunningham's Sons Co. factory, Rochester, N. Y.

THIS horizontal boring mill can bore and machine two crankcases in 50 minutes. It dispenses with the use of a very heavy swing lathe and can take care of two of the cases at the same time. The illustration shows the machine with two crankcases which are having the rear ends faced off. Before facing off the ends the holes for the shaft have been bored and scraped to perfect alignment and the cases have then been mounted on a single arbor and placed in the machine. A complete circle is used to caliper the ends for the sake of accuracy. One man can operate the entire machine as the parts which are worked upon are not too heavy for him to handle economically and it requires the setting-up work but once an hour. With the heavy swing lathes previously used in this work the time required was approximately double and two men would have been working on the two crankcases instead of one. The machine described is used in the Cunningham factory at Rochester, N. Y.

LORD BALTIMORE'S Plant—The Lord Baltimore Motor Car Co., Baltimore, Md., has closed negotiations with the Board of Trade in Washington, Pa., to build a factory 255 feet square, occupying 2½ acres. Work on the construction of the new factory will be pushed with all possible haste. The building will be of steel and concrete, one story in height, and will be thoroughly equipped for the making of motor trucks. The company in its new factory will be prepared to turn out 4,000 trucks annually. It will only aim the first year, however, to manufacture 2,000 cars, increasing its output later. It will employ in the neighborhood of 100 men.

Shaffer Adds to Keeton Plant—C. B. Shaffer, president of the Keeton Motor Co., Detroit, Mich., has ordered several additions constructed to the new factory.

Hoover Plant Doubled—The Hoover Steel Ball Co., Ann Arbor, Mich., will double its plant. The present factory is entirely of brick and concrete construction and fireproof.

Maxwell's Machine Shop—The Maxwell Motor Co., Dayton, O., has awarded contracts for an addition to its machine shop. This structure will be 27 feet by 168 feet, built of brick or frame.

Swinehart's New Factory—The announcement is made by the Swinehart Tire & Rubber Co., Akron, O., that a new factory building will be erected which will almost treble its output during the coming year.

Factory for Saginaw—The Wilcox & McKim Mfg. Co., St. Louis, Mo., capitalized at $125,000, and making automobile parts, has decided to locate in Saginaw, Mich. One hundred and twenty-five men will be employed at the start.

New Hudson Factory—The Hudson Motor Car Co., Detroit, Mich., contemplates the building of a third factory building within the next year. The new structure is 578 feet in length by 90 feet in width and supplants the section of the factory grounds which resembled a tented city. By the spring of 1923 the size of the Hudson plant, if it grows as is planned by the company, will consist of fully fifteen individual factory buildings averaging 600 by 80 feet.

To Build in Stockton—J. E. Goodman, who recently organized a company capitalized for $100,000 in Stockton, Cal., to build puncture-proof tires, will shortly erect a plant.

Canton Rubber Company Enlarges—The Canton Rubber Co., Canton, Ohio, is planning to enlarge its plant and has petitioned the city council to acquire a small tract of city property located near its present plant.

Dreadnought Tire Builds—The Dreadnought Tire & Rubber Co., Baltimore, Md., recently incorporated with a capital of $1,000,000, contemplates the erection of buildings and installation of machinery to manufacture automobile tires and miscellaneous rubber goods.

Shotwell-Harris Plant—The Shotwell-Harris Co., Minneapolis, Minn., has approved plans and will ask for bids soon on the construction of a plant in the automobile district at Sixteenth street and Hennepin avenue, for the manufacture of tools and dies.

Alliance Purchases Site—The Alliance Motor Car Co., Alliance, Ohio, has purchased a site upon which will be erected a two-story factory building which will be used for the manufacture of automobiles. It is expected to have the plant completed soon after April 1.

Halley Extensions—Halley's Industrial Motors, Ltd., has been making large extensions to its works at Yoker, Glasgow, which are expected to be completed by the middle of March. As a result the company expects shortly to be able to double the output of the factory and thus to overtake its orders and to ensure prompt delivery. The new works cover about 1 1-2 acres of ground.

Rapp Holds Meeting—A special meeting of the Rapp Mfg. Co., Toledo, Ohio, was recently held for the purpose of authorizing a change of the firm name to the Toledo Spark Plug Mfg. Co. An increase in the capital stock from $15,000 to $25,000 was also voted at this meeting. Additional space in the Toledo factories building has been acquired and the plant will occupy three times its present floor space, while $10,000 will be expended in new machinery to facilitate working conditions and provide means for a greater output. It is said that when the plant is enlarged and the new machinery installed it will have an output of 4,000 spark plugs a day.

Four Wheel Drive's Plant—The Four Wheel Drive Automobile Co., Clintonville, Wis., organized 3 years ago to manufacture commercial and passenger cars utilizing the Zachow-Besserdick patents for drive to both front and rear axles, is about to realize its long cherished plan of establishing a new plant. Several months ago the capital stock was increased from $50,000 to $250,000, and on March 1 the additional stock was reported sold. The board of directors in special session immediately voted in favor of starting at once upon the construction of a new plant, to consist of three buildings, two of them to be 100 feet by 120, and the other, a power plant, 60 feet by 80. The buildings will be erected adjoining the present plant, the former Zachow-Besserdick machine shops, which will be used for patterns and warehouse. The company will thus be enabled to more than quadruple its output and will employ 500 men.

Shows, Conventions, Etc.

March.....Indianapolis, Ind., Spring Automobile Show, State Fair Grounds, Indianapolis Automobile Trade Association.

March.....Nashville, Tenn., Annual Show, Nashville Automobile Dealers' Association.

March 17-22.....Norfolk, Va., Annual Show, Armory Building, Norfolk Automobile Trade Association, Inc.

March 19-22.....Springfield, Ill., Annual Show, Springfield Commercial Association, W. L. Chapin, Mgr.

March 19-26.....Boston, Mass., Annual Truck Show.

March 20-24.....New Orleans, La., Annual Show, N. O. A. D. A.

March 24-29.....Indianapolis, Ind., Annual Automobile Show.

Mar. 27-April 3....Quincy, Ill., Mississippi Valley Automobile Show, H. F. Hofer, Director.

March 31-April 5..Manchester, N. H., Automobile Show, Dealers' Association, J. H. Graham, Manager.

April 1-6.....San Francisco, Cal., Motor Truck Show, Coliseum Hall, *Motor Field.*

April 5-19.....Pittsburgh, Pa., Annual Show, East Liberty Market House, Dealers' Association.

June 5, 6, 7.....Detroit, Mich., Midsummer Meeting of Society of Automobile Engineers.

Race Meets, Runs, Hill Climbs, Etc.

May 30.....Indianapolis, Ind., 500-Mile Race, Speedway.

July 1.....Indianapolis, Ind., Tour of Indiana Automobile Manufacturers' Association to the Pacific Coast.

July 1-16.....Winnipeg, Man., Motor Plow Competition, Dr. A. W. Bell, Manager.

July 8-16.....Winnipeg, Man., Midsummer exhibition, A. C. Emmett, Manager.

July 27-28.....Tacoma, Wash., Tacoma Road Races.

Nov. 24.....Savannah, Ga., Vanderbilt Cup Race, Motor Cups Holding Company.

Nov. 26.....Savannah, Ga., Grand Prize Race, Automobile Club of America.

Foreign

March 31.....Montevideo, Uruguay, International Competition of Agricultural Motor Vehicles.

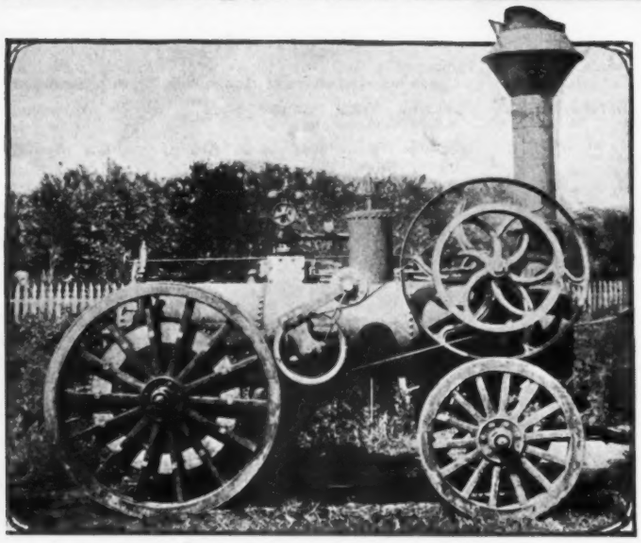
April.....Barcelona, Spain, International Exhibition.

May.....St. Petersburg, Russia, International Automobile Exposition, building of Michael Maneze, Imperial Automobile Club of Russia.

July 12.....Amiens, France, Grand Prix Race.

Sept. 25.....Isle of Man, International Stock Car Race.

The Locomobile Co. of America's factory at Bridgeport, Conn., which occupies a 50-acre tract on the shore of the Bridgeport harbor and has a water front of almost a mile



Copy of an old photograph, showing the early application of power to a road vehicle by itself. This photograph was taken in the year 1873. It was the ingenious application to an old threshing machine engine by the president of the Sternberg Mfg. Co., Milwaukee, Wis., of almost the same principles now used in modern motor trucks. Note the gear drive

Waverley electric delivery wagon in service of the United States parcel post, Indianapolis, Ind.

Exterior of the service station and salesrooms of the Foster Motor Car Co., Virginia and North Carolina, distributors for the KlineKar in Richmond, Va.

MOTOR Ambulance Wanted.—Tenders for the supply of a motor ambulance and two motor hose tenders required by the Johannesburg municipal council will be received up to March 28 by the Town Clerk, Municipal Offices, Plein Square, Johannesburg, South Africa, from whom copies of the contract form may be obtained. As the time for receipt of tenders is limited, only firms having agents in South Africa who can be instructed by cable will be able to avail themselves of this opportunity. All inquiries will be answered at the Bureau of Foreign and Domestic Commerce, Washington, D. C., File No. 10559.

Briggs Lord Baltimore Engineer.—H. M. Briggs has succeeded O. R. Bisler as engineer of the Lord Baltimore Motor Car Co., Baltimore, Md.

Motz Washington Branch—The Motz Tire & Rubber Co., Akron, O., has opened a branch at 1012 Fourteenth street, N. W., with F. G. Fickling as manager.

English Company Moves.—Trier & Martin, Ltd., has changed its offices from Great Portland street, W., to Trinity Works, New Church Road, Camberwell, S. E.

Organizes Vulcanizing Company—G. W. Smith of Beloit, Wis., has organized the Beloit Vulcanizing Co. and established a tire and repair shop at 415 Broad street.

Twyman Pennsylvania Tire Agency—The Twyman Motor Car, Columbus, O., has taken the agency for the Pennsylvania line of tires. J. A. Johnson is the manager.

Purchases Beloit Garage—W. H. Gragg has purchased the Allen Garage and business in Beloit, Wis. It is the first garage to be established in Beloit, having been built by Harry Vail in 1908.

St. Onge Leaves Detroit Electric.—W. J. St. Onge has resigned his position as advertising manager of the Anderson Electric Car Co., Detroit, Mich., maker of the Detroit electric. He is succeeded by W. P. Haines.

Fire Truck for Wilmington—A motor fire truck is to replace a horse-drawn extension truck now in use by the Wilmington, Del., Fire Department. A committee appointed to consider the matter visited the Webb factory at Allentown, Pa., recently.

Tracy Opens New Branch.—R. B. Tracy, western manager of the Michelin Tire Co., Milltown, N. J., has opened a new branch at 1106 Hennepin street, Minneapolis, Minn. This branch takes care of the territory of North and South Dakota, Minneapolis and Northern Wisconsin.

Mayer Carbureters for Coast.—The Maydwell Co., of Los Angeles, Cal., has taken the distributing agency for Mayer carbureters on the Pacific Coast. The Los Angeles company has branches in San Francisco and in Seattle, Wash., and will establish service stations in connection with each of the branches.

Reedy Invents Carbureter.—I. R. Reedy, of 1136 W. Third street, Dayton, Ohio, has invented a new carbureter which it is claimed will run an automobile at an angle of 60 degrees with its own supply. It is claimed to be adaptable for aeroplane use and is claimed to be of superior character because the angle of its use does not affect mixture.

Thompson Keeton Sales Representative.—C. W. Thompson, Rochester, N. Y., has become identified with the Keeton Motor Co., Detroit, Mich., as sales representative for the State of New York, covering territory east of Batavia, N. Y., and northern counties of Pensylvania, with the exception of four counties in the northwestern section of the state. He will tour in a Keeton Six and thus cover territory.

Drawback on Axles.—A ruling has been made by the Treasury Department, Washington, D. C., that drawback shall be allowed under section 25 of the tariff act of 1909, on motor car axles manufactured by the McCue Co., Buffalo, N. Y., with the use of imported annular bearings. The drawback allowance shall not exceed the number of bearings appearing in the exported axles as shown by the sworn statement of the manufacturers filed with the collector of customs at Buffalo.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Adrian, Mich.	Cole	C. E. Simmons
Asheville, N. C.	Cole	Enterprise Machine Co.
Baltimore, Md.	Cole	Cole Sales Co.
Bath, N. Y.	Cole	Wm. H. Hopkins
Beaver Falls, Pa.	Cole	Seanor & Williams Co.
Berlin (Ont.) Canada	Cole	Aaron Bricker
Bismarck, N. D.	Cole	Lehr Motor Sales Co.
Boston, Mass.	Nyberg	Clyde H. Smith Motor Co.
Boston, Mass.	Palmer-Singer	H. A. Clapp
Breese, Ill.	Cole	Breese Garage
Brockton, Mass.	Cole	L. E. Reynolds
Buffalo, N. Y.	King	Monroe Motor Car Co.
Buffalo, N. Y.	Lenox	Monroe Motor Car Co.
Buffalo, N. Y.	Marion	Monroe Motor Car Co.
Carroll, Ia.	Cole	J. E. Osborne
Charleston, Miss.	Cole	Thompson Anderson
Charlevoix, Mich.	Cole	J. A. Vought
Chattanooga, Tenn.	Cole	Hirsch Bros.
Connellsville, Pa.	Cole	Connellsville Garage
Columbia, Tenn.	Cole	Columbia Motor & Implement Co.
Columbus, O.	Crow-Elkhart	Clintonville Garage & Auto Co.
Covington, Tenn.	Cole	Walter Haynie
Crestline, O.	Cole	Crestline Garage Co.
David City, Nebr.	Cole	Doty Motor Co.
Detroit, Mich.	Lozier	Berkeley Garage
East Hampton, N. Y.	Franklin	Halsey's Garage
Eustis, Fla.	Cole	N. R. Herrick & Co.
Hamilton (Ont.), Can.	Cole	Patterson Auto Sales Co.
Hammond, Ind.	Cole	Mrs. Laura Heintz
Hartford, Conn.	Cole	M. J. Bliss
Hazleton, Pa.	Cole	Adam Eidam
Joliet, Ill.	Cole	S. J. Harrigan
Keokuk, Ia.	Cole	Ayer Mfg. Co.
Little Falls, N. Y.	Cole	N. B. Bronner
Moberly, Mo.	Cole	John N. Taylor
Milwaukee, Wis.	Cole	Cole Motor Co.
Morris, Ill.	Cole	Osmanson Bros.
Muskegon, Mich.	Cole	W. P. Marshall
Newton, Ia.	Cole	Barngrover Auto Co.
Oakland, Cal.	Cole	W. J. Freeling
Paterson, N. J.	Cole	Ford Auto Co.
Philadelphia, Pa.	Henderson	Motor Sales Co.
Pensacola, Fla.	Cole	Gulf Coast Garage & Sales Co.
Port Richmond, L. I.	Cole	I. A. Silvie, Jr.
Pueblo, Colo.	Cole	Tyler Auto Co.
Quebec (Que.), Can.	Cole	Frank Campbell
Rochester, Vt.	Cole	F. J. Robinson
Sacramento, Cal.	Cole	J. S. Casey
Salem, Ore.	Cole	Chamberlin Bros.
Saskatoon (Sask.), Can.	Cole	Robert McIntosh
Sherrard, Ill.	Cole	Kinsey & Danielson
Springfield, Mass.	Cole	Shean Auto Station
Strong City, Kans.	Cole	Jacob Hinden
Syracuse, N. Y.	Franklin	Bull & Young
Tampa, Fla.	Cole	West Coast Auto Co.
Topeka, Kans.	Cole	Vesper & Evans
Toronto, Ont.	Berliet	Conboy Carriage Co.
Traverse City, Mich.	Cole	William Goode
Victoria (B. C.), Can.	Cole	Moore & Pauline
Washington, D. C.	Case	R. C. Creyke
Washington, D. C.	Cutting	Cutting Motor Sales Co.
Watseka, Ill.	Cole	Burnham & Body
Wilkes-Barre, Pa.	Cole	D. & H. Auto Co.
Williamsport, Pa.	Cole	E. L. Sheffer
Winona, Minn.	Cole	Gate City Garage

COMMERCIAL VEHICLES

Chicago, Ill.	Sternberg	Foraker Motor Truck Co.
Columbus, O.	Service	Service Motor Truck Co.
Huntington, L. I.	Sternberg	Bergen Garage, Inc.
Ottawa, Can.	Stewart	Ontario Motor Car Co.
Philadelphia, Pa.	Brown	Bartlett Garage, Inc.
St. Paul, Minn.	Sternberg	E. F. Morgan Co.
Toronto, Ont.	Stewart	Ontario Motor Car Co.

Bassett Heads Case Branch—F. E. Bassett will be manager of the new Milwaukee, Wis., branch of the J. I. Case T. M. Co., Racine, Wis.

Miller Brothers' New Salesroom—Miller Brothers, automobile dealers in Glens Falls, N. Y., have opened up a new salesroom in that city.

Gray Goodyear Manager—C. H. Gray has been appointed manager of the Milwaukee, Wis., branch of the Goodyear Tire & Rubber Co., Milwaukee, Wis.

Johnson, Manager Ford—F. T. Johnson has joined the forces of the Ford Motor Co., Detroit, Mich., and has been made manager of the Omaha, Neb., branch.

Adding to Garage—The Haney-Pistor Co., Kewannee, Wis., is building a large addition to its garage and salesrooms. It will be of concrete construction and will have room for fifty cars.

College Station Wants Apparatus—The State Fire Marshal has recommended the expenditure of $21,713 at the Agricultural and Mechanical College, College Station, Tex., for better fire protection.

Goodhart Goes to Lippard-Stewart.—H. H. Goodhart has been made advertising manager of the Lippard-Stewart Motor Car Co., of Buffalo, N. Y. He was formerly with the Franklin Automobile Co., Syracuse, N. Y.

Wants Fire Apparatus.—A committee headed by City Judge Daniel Crowley has requested the fire commissioners of Ithaca, N. Y., to recommend to the common council of that city the purchase of a combination hose and chemical automobile.

Express Company in Kutztown—Kutztown, Pa., citizens have organized the Kutztown and Reading Automobile Express Co. to carry freight between the two places, stopping en route at Fleetwood, Blandon, Temple and Hyde Park on several trips daily.

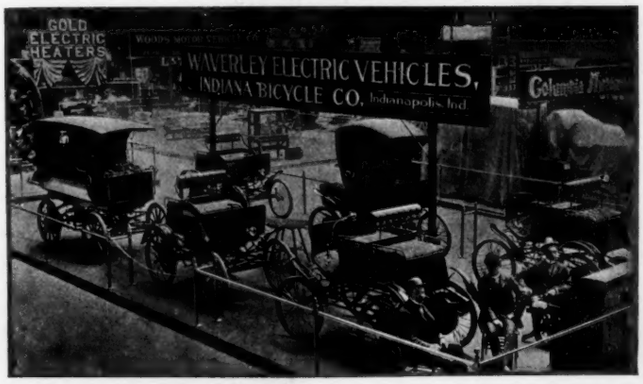
Lowry Promoted—S. W. Lowry will shortly take over the control of the Southern territory of the Pacific Coast for the Pennsylvania Rubber Co., Jeannette, Pa., with headquarters at Los Angeles, Cal. Mr. Lowry is now manager of the company's Pittsburgh, Pa., branch.

American Cars in Trinidad—American cars are used almost entirely on the British island of Trinidad, off the coast of South America. During 1912 forty-four cars were imported during the year. The popular preference is for a light car that does not cost over $1,000, but some market exists for better cars.

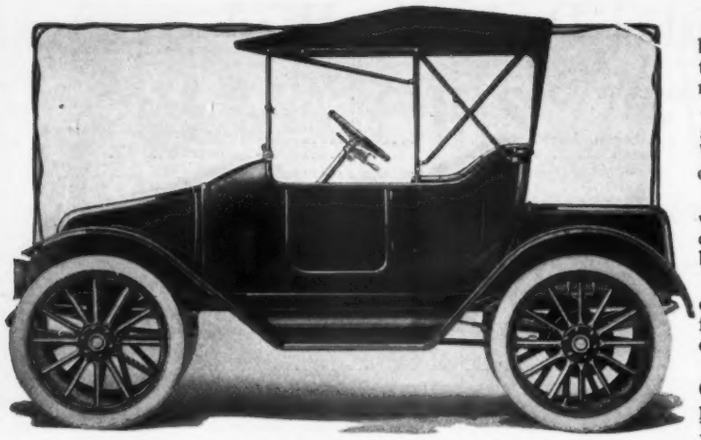
Washington Club Business Proposition—A paid membership of 293 has been reached by the newly organized Washington, D. C., Motorists' Association. This organization is purely a business proposition entirely devoid of the social end of the automobile. The new association desires to place in membership all persons within the District of Columbia interested in the adoption, use and maintenance of the motor-driven vehicle.

Clubs Join in Tire Test—Means for comparing in a measure road condition in the United States and England will be afforded by the results of a series of certified tire tests that are about to be undertaken with the same make of tire by the Automobile Club of America and the Royal Automobile Club. The local test will be conducted by the technical laboratory of the A. C. A., and like the English trial, will be of 10,000 miles' duration.

Wants Electric Automobile Agency—An American consular officer reports that a resident of his district, who has been engaged in the automobile trade for many years, desires to secure the local representation of American manufacturers of electric automobiles, including touring cars and commercial vehicles. These manufacturers are requested to send him their catalogues and price lists, together with a statement showing their annual output of the various classes of cars referred to. If it appears that satisfactory arrangements are likely to be made, the inquirer will probably visit the United States in order to get in touch with the manufacturers. All information may be had by addressing all inquiries to the Bureau of Foreign and Domestic Commerce, File No. 10,584, Washington, D. C.



Pioneers of the electric automobile industry on exhibition at Madison Square Garden in May, 1899



The new Baker electric roadster, a product of the Baker Motor Vehicle Co., Cleveland, O.

Newton with White—M. R. Newton has become director of publicity for the White Co., Cleveland, O.

Swinehart's Buffalo Agency—The Swinehart Tire & Rubber Co., Akron, Ohio, recently opened an agency in Buffalo, N. Y.

Kulas Peerless Sales Manager—E. J. Kulas has become the general sales manager of the Peerless Motor Car Co., Cleveland, O.

Six-story Supply House—W. S. P. Oskamp has plans for a six-story fireproof automobile supply house in Cincinnati, O.

Cross Holly Sales Manager—The Holly Bros. Co., Detroit, Mich., announces the appointment of C. W. Cross as sales manager.

Newark Franklin Dealer Moves—E. D. Carlough, Franklin dealer in Newark, N. J., has just moved into new quarters at 35 Halsey street.

Ridler Pope Sales Manager—F. M. Ridler has been promoted to the position of sales manager of the Pope Mfg. Co., Hartford, Conn.

New Supply House Opened—The Post & Lester Co. has opened an automobile supply store at Waterbury, Conn. W. H. Lewis is manager.

Babcock Firestone Advertising Manager—E. S. Babcock has been appointed advertising manager of the Firestone Tire & Rubber Co., Akron, Ohio.

Case Company's New Salesrooms—The J. I. Case T. M. Co., Inc., Racine, Wis., announces the opening of a new automobile salesroom in Milwaukee, Wis.

Becker Establishes Baltimore Agency—Howard Becker has taken the agency in Baltimore, Md., for the Michigan and Wizard igniting and lighting storage batteries.

Miner President Hartford Association—S. A. Miner was elected president of the Hartford Automobile Dealers' Association, Hartford, Conn., at a recent meeting.

Williams Franklin Advertising Manager—W. H. Williams has been promoted to the position of advertising manager of the Franklin Automobile Co., Syracuse, N. Y.

Rochester Planning Apparatus Additions—Rochester, N. Y., plans to add two motor-driven hose carts to its fire-fighting equipment within the next few months.

Offer City an Automobile—The Hansen Automobile Co., Wilmington, Del., has offered to give the city a runabout for the use of the chief of the fire department.

New Brazilian Tariff Schedule—Publication has just been made of the new tariff schedule in Brazil and no increases were made on automobiles or on automobile sundries.

Best Promoted—Leigh Best, one of the vice-presidents of the American Locomotive Co., Providence, R. I., has become head of the automobile department of that company.

Mackemer-Pinkerton's Salesrooms—The Macemer-Pinkerton Automobile Co., Galesburg, Ill., recently opened a new salesroom at 256 East Simmons street. It handles the Ford car.

Doherty Henderson Manager—The Henderson Motor Car Co., Indianapolis, Ind., has appointed H. W. Doherty as Northwest district manager, with headquarters in Tacoma, Wash.

Haines Anderson Advertising Manager—W. P. Haines has been appointed advertising manager of the Anderson Electric Car Co., Detroit, Mich., succeeding W. J. St. Onge, resigned.

Moskovics with W., C. & P.—F. E. Moskovics has become associated with the Wyckoff, Church & Partridge Guy Vaughan interests, which are to produce a new light six-cylinder car.

Automobiles in Bar Harbor—The bill repealing the law which excludes automobiles from Bar Harbor, Me., will become effective as soon as Governor Haines of Maine affixes his signature to it.

New Geneva Garage—Plans have been completed for the construction in Geneva, N. Y., of a large garage of reinforced concrete. The garage will be constructed in Exchange street by F. Madia.

Phelps with Moline—R. W. Phelps, sales manager of the Great Western Automobile Co., Peru, Ind., has been appointed assistant sales manager and publicity man for the Moline Auto Co., East Moline, Ill.

Baltimore Companys New Quarters—The Chesapeake Motor Co., Baltimore, Md., Hupmobile agent, has acquired 1018 Morton street as its salesrooms and garage and will also conduct a storage business there.

Automobile Incorporations

AUTOMOBILES AND PARTS

AKRON, O.—Summit Automobile Co.; capital, $10,000; to manufacture and deal in pleasure and commercial motor vehicles. Incorporators: E. J. Eblen, J. M. Sauder, F. L. Metz, Rachel Sauder, Almira Elben.

BOSTON, MASS.—Westcott Motors Co.; capital, $8,000. Incorporators: Orris W. Nelson, Harvey L. Kemp, Geo. H. Learned.

BROOKLYN, N. Y.—Montauk Motor Co., Inc.; capital, $10,000; to do a general auto business. Incorporators: Louis F. Ohse, James K. B. Webber, Morton Foster.

CHARLESTON, S. C.—Arby Automobile Co.; capital, $200,000. Incorporators: Santo Sottile, M. R. Rivers, L. M. Pinckney.

CINCINNATI, O.—Armstrong Motors Co.; capital, $10,000; to manufacture and deal in automobiles and all parts thereof. Incorporators: James H. Armstrong, Luella S. Armstrong, Clara M. Eggers, S. S. Stewart, Harry Bronworth.

CLEVELAND, O.—Gustav Schaefer Wagon Co.; capital, $55,000; to manufacture wagons, vehicles and automobile bodies. Incorporators: Gustav Schaefer, Henry G. Schaefer, Charles E. Mortiz, Arthur Kruse, Anna M. Schaefer.

DECATUR, O.—Dawson Automobile Co.; capital, $10,000. Incorporators: Earle M. Dawson, Chas. E. Dawson, Florence L. Dawson.

DETROIT, MICH.—Detroit Automobile Exchange; to deal exclusively in used cars. Incorporators: G. C. Farnsworth, R. M. Drysdale, E. W. Pingree.

DETROIT, MICH.—King Motor Car Co.; capital, $200,000. Incorporators: J. G. Bayerline, Arteman Ward, Jr., F. A. Vollbrecht.

DETROIT, MICH.—Moore Truck & Mfg. Co.; capital, $20,000; to manufacture motor trucks. Incorporators: F. A. Moore, H. A. Peters, C. W. McColl.

INDIANAPOLIS, IND.—Ray Harroun Co.; capital, $50,000; to manufacture and sell motor cars. Incorporators: Ray Harroun, E. G. Baker, E. C. Sourbier.

MT. VERNON, N. Y.—Motor Truck Mfg. Corp; capital, $150,000; to manufacture and deal in motors, engines, etc. Incorporators: H. Hitchenbach, L. Bertsch, A. J. Albert.

NEW YORK CITY.—Associated Auto Mechanics Inc.; capital, $100,000; to deal in autos and auto parts. Incorporators: Charles Tichenor, Harry Barnes, William J. Hoover.

NEW YORK, N. Y.—Brady Murray Motors Corp; capital, $55,000; to deal in motor trucks, cars, autos, etc. Incorporators: Arthur T. Murray, Samuel T. Marcus, Charles Wein.

NEW YORK, N. Y.—Commercial Truck Co. of America; capital, $3,000,000. Incorporators: J. F. Curtin, H. O. Doughlan, J. M. Satterfield.

NEW YORK, N. Y.—Henry Tobin Co., Inc.; capital, $50,000; to deal in automobiles. Incorporators: Henry Tobin, Richard F. Tobin, Jos. B. McDonough.

NEW YORK CITY.—The Albert E. Eldredge Corp.; capital, $7,000; to manufacture motors, machinery, etc. Incorporators: A. E. Eldredge, John J. H. Poillon, Julia M. Wilkinson.

PATCHOGUE, N. Y.—John R. Swezey Automobile Co., Inc.; capital, $5,000. Incorporators: John R. Swezey, Nathaniel N. Swezey, Ella B. Swezey.

PINEVILLE, KY.—Cumberland Motor Co.; capital, $50,000. Incorporators: N. J. Weller, A. W. Bryant, M. J. Moss, John A. Pitman.

PITTSBURGH, PA.—Gibson Motor Car Co.; capital, $3,000,000; to manufacture and deal in engines, motors and all equipments thereto. Incorporators: J. H. Mahoney, E. D. Johnson, C. E. Gibson.

ROCHESTER, N. Y.—Rochester Automobile Exchange; capital, $500. Incorporators: Bertram E. Wilson, W. Hayes, Mitchell Dewitt, Owen D. Dewitt.

SALT LAKE CITY, UTAH.—Deseret Motor Truck Co.; capital, $50,000. Incorporators: Ira Cole, Domine Burns, J. E. Fleige.

WYANDOTTE, O.—Moore Truck & Mfg. Co.; capital, $20,000; to manufacture trucks.

GARAGES AND ACCESSORIES

ALLIANCE, O.—Alliance Rubber Co.; capital, $100,000; to manufacture and deal in rubber goods of all kinds including automobile tires. Incorporators: Geo. C. Russell, Milton Bejach, W. H. Purcell, M. S. Melbourne, Robert Auld, Sr., F. E. Dussell, H. F. Bobecker.

BALTIMORE, MD.—Dreadnaught Tire & Rubber Co.; capital, $1,000,000. Incorporators: E. D. Buck, G. W. Dillman, B. M. Crawl.

BROOKLYN, N. Y.—F. & P. Auto Transportation Co., Inc.; capital, $70,-

Carpenter's Indianapolis Office—W. W. Carpenter, western representative of the Jones Speedometer Co., New York City, will be located in Indianapolis, Ind. He has taken an office at 1201 State Life Building.

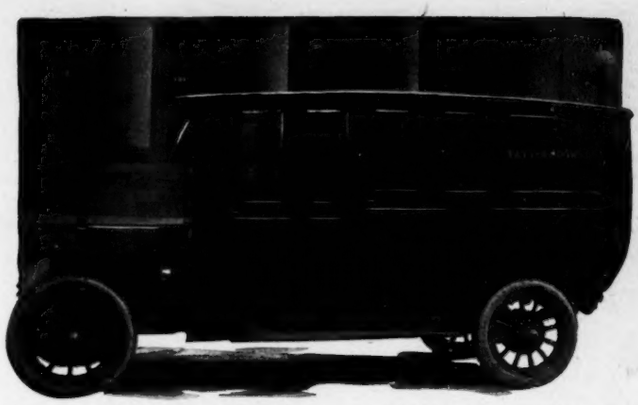
Bosch Magneto Appointments—The Bosch Magneto Co., New York City, has appointed the following firms as distributors of its various products: Ballou & Wright, Seattle, Wash., and E. A. Featherstone, Los Angeles, Cal.

Civic Garage in Rochester—The Board of Contract and Supply, Rochester, N. Y., recently awarded contracts for the immediate construction of the new civic garage which has been advocated for that city for the past year. It will cost $22,411.

Large Garage in Birmingham—The Cumberland Motor Car Co., Birmingham, Ala., recently moved into one of the largest garages in the South. Two show rooms each 100 feet long are provided. Several standard cars are carried by the company.

Stoll Assistant Sales Manager—O. E. Stoll has been appointed assistant sales manager of the General Motor Truck Co., Detroit, Mich., to fill the vacancy occasioned by the transfer of E. J. Kilborn to Chicago, Ill., as manager of the branch there.

Gray & Davis Baltimore Agency—The exclusive agency in Baltimore, Md., for the Gray & Davis lighting and starting system is held by the Auto Electric Co., which is also conducting a service station to care for automobiles equipped with this system.



Great Western car designed as a combination limousine and ambulance in Peru, Ind.

Colleges Interested in Automobiles—To encourage visits by the engineering classes of the large universities, the sales department of the Lozier Motor Co., Detroit, Mich., has issued invitations to the more important colleges throughout the country for a visit of inspection to the factory in Detroit.

Highway Engineering Course Success—The winter course in highway engineering at the Ohio State University, Columbus, O., is realizing the hopes of those who started the movement. The enrollment is sixty, not including the senior engineers who are regularly attending and the juniors who attend part of the time.

Ricker Opens Indianapolis Office—C. S. Ricker, formerly chief engineer of the Henderson Motor Car Co., Indianapolis, Ind., has opened an office at 1201 State Life Building, that city. Mr. Ricker will do consulting engineering work for several automobile companies and a considerable amount of publicity work also.

Hoover Purchases Flanders Department—The Hoover Steel Ball Co., Ann Arbor, Mich., has purchased the steel ball department of the Flanders Mfg. Co., Chelsea, Mich., which has been in the hands of a receiver since December 6, 1912. It is the intention of the Hoover company to move this department to its new factory at Ann Arbor.

Milwaukee Buys Five Cars—The commissioner of public works, Milwaukee, Wis., has contracted with the Mitchell Automobile Co., Milwaukee, Wis., for five passenger cars for the use of its various officials. The contract for two 1 1-2-ton trucks for the waterworks department was awarded to the Kissel Motor Car Co., Hartford, Wis.

Gemmer's Air Starting Device—It is reported that G. A. Gemmer, formerly of the Gemmer Mfg Co., Detroit, Mich., maker of steering gears, is organizing a company to manufacture an air starting device which he has invented. It is said to be built upon the principle of the electric starter, having a combination pump and motor, the entire outfit weighing about 50 pounds.

Ajax Offers Prizes—Five thousand dollars in prizes are offered in an annual service competition for Ajax tires, beginning April 1 next and terminating on March 31, 1914, by the Ajax-Grieb Rubber Co., Trenton, N. J. For the chauffeurs who in that space of time make the best mileage records out of their Ajax tires there are altogether 208 prizes to be distributed among the winners.

Automobile Polo in London—Richard Klegin, an American promoter, recently arrived in London, Eng., and commenced negotiations for automobile polo games in that city during the coming season. He purposes to bring over the eight participants from the games held in Madison Square Garden, New York City. The contests will occur either in the Olympia or at the Shepherd's Bush Stadium probably in May.

Automobiles in Lansing Schools—Lansing, Mich., has adopted a plan whereby the pupils will receive an automobile education. They spend the first year in school and after that they divide their time equally between school and shop, either in the automobile or gas-engine shop. After a short vacation they will alternate between school and some Lansing plant, where they will get the practical experience and also will be paid for their work.

Automobile Incorporations

000. Incorporators: William O. Goddard, Frank K. Fairchild, Geo. A. Logan.

BUFFALO, N. Y.—V. W. Bonham Mfg. Co., Inc.; capital, $20,000; to manufacture auto pumps, other pumps and machinery of all kinds. Incorporators: Edward C. Schwingel, E. S. McCready, James R. Pratt.

CINCINNATI, O.—F. M. Rose, Springfield Co.; capital, $100,000; to manufacture a patented automobile wheel.

DETROIT, MICH.—Superior Foundries Co.; capital, $30,000; to do foundry work. Incorporators: Jos. Sturges, W. L. Willard, H. T. Peters, R. T. Holte, J. G. Williams.

INDIANAPOLIS, IND.—Motor Starter Mfg. Co.; capital, $40,000; to manufacture motor starters. Incorporators: S. M. Brundage, W. J. Sylvester, H. J. Herff.

KINGSTON, N. Y.—Brown Auto Supply Co.; capital, $7,000. Incorporators: Emerson Brown, Lewis Brown, Rodney B. Osterhoudt.

MILWAUKEE, WIS.—Escott's Auto Livery & Garage Co.; capital, $15,000. Incorporators: F. A. Escott, Clara A. Escott, Richard S. Witte.

MINNEAPOLIS, MINN.—O. Fenstermacher; capital, $300,000; to handle accessories.

MUNCIE, IND.—Derrickson Mfg. Co.; capital, $125,000; to manufacture automobile accessories. Incorporators: Harry S. Osborn, H. L. Kesselman, B. C. White.

NEW YORK, N. Y.—Auto Signalite Co., Inc.; capital, $2,000; to deal in automobile supplies. Incorporators: Robert C. Norton, Anna D. Chersan, Lelema E. Koblish.

NEW YORK CITY.—Charles E. Hottum, Inc.; capital, $20,000. Incorporators: Charles E. Hottum, Maud J. Hottum, William H. Coffey.

NEW YORK, N. Y.—Continental Rubber Works Selling Agent, Inc.; capital, $3,000; to deal in rubber goods, tires, etc. Incorporators: Clarence E. Thornall, Willis A. Darling, Walter S. Tullis.

NEW YORK, N. Y.—Dayton Automobile Repairing Co., Inc.; capital, $5,000. Incorporators: Chas. E. Holst, Victor Drummond, Valentine E. Mott.

NEW YORK CITY.—New York Oil & Grease Co.; capital, $60,000; to manufacture and deal in lubricating oils, greases, etc. Incorporators: George T. Roberts, Garfield Carson, George G. Francis.

NEW YORK, N. Y.—Peteler Shock Absorber Corp.; capital, $50,000. Incorporators: James L. Allen, Charles L. Moreau, Frederick O. Lyon.

NEW YORK CITY.—Seeing New York Automobiles, Inc.; capital, $10,000; to operate sight seeing automobiles. Incorporators: Geo. H. Mulligan, Thomas Frost, Joseph V. Fallon.

NEW YORK CITY.—Universal Shock Eliminator, Inc.; capital, $15,000; to manufacture devices for eliminating road jars and shock to autos. Incorporators: Richmond Weed, Emile Dreyfus, Leslie S. High.

RACINE, WIS.—Wisconsin Electric Co.; capital, $50,000; to manufacture electrical appliances and devices. Incorporators: Louis Hamilton, C. H. Beach, W. W. Storms.

RHINELANDER, WIS.—Oneida Garage & Machine Co.; to open a garage and repair shop. Incorporators: Will Gilligan, Edwin Priebe.

ROCHESTER, N. Y.—Durno Mfg. Co.; capital, $100,000; to manufacture mechanical appliances for automobiles. Incorporators: John H. Durno, John F. Turk, Milton Noyes.

THOMASVILLE, GA.—Clark's Resilient Tire Filler Co.; capital, $100,000; to manufacture tire fillers. Incorporators: J. T. Clark, A. B. Clark, J. E. Golden.

UTICA, N. Y.—Divine Tire Co., Inc.; capital, $225,000. Incorporators: Charles W. Wicks, A. James Eckert, Bradford H. Devine.

VICTORIA, TEX.—Park Garage; capital, $10,000. Incorporators: John Fraser, J. T. Linebaugh, W. H. Crain.

WASHINGTON, PA.—International Combustion Loco Co.; capital, $1,000,000; to manufacture, buy, sell and deal in locomotives and internal combustion machines of all kinds. Incorporators: Thomas H. McKay, James W. McKay, John G. Gray.

WHITESTONE, N. Y.—Whitestone Garage, Inc.; capital, $5,000. Incorporators: Herbert A. Tretman, John A. O'Fee, Mary E. O'Fee.

CHANGES OF CAPITAL AND NAME

COLUMBUS, O.—Rogers Supply & Tire Co.; capital increased from $10,000 to $25,000.

DETROIT, MICH.—Gies Gear Co.; capital decrease from $50,000 to $25,000.

MIDDLETOWN, O.—Miami Cycle & Mfg. Co.; capital increased from $1,100,000 to $2,064,500.

Patents Gone to Issue

AUTOMATIC Carbureter Design—In which the increasing suction of the motor enlarges the air intake port and widens the cross area of the venturi tube surrounding the nozzle.

This carbureter, Fig. 1, consists of a casing, the upper portion of which contains a passage I communicating with the intake manifold, while the lower portion includes an air-inlet port. The latter surrounds the lower portion of the gasoline nozzle N and is normally almost entirely closed by the cylindrical mantle of a sleeve S. The lower portion of the sleeve is tapered to fit the similarly shaped portion of the carbureter body. This sleeve is slidable in the main, vertical passage concentrically in which the nozzle N is in place. At low motor speeds the sleeve closes the air passage around the nozzle almost entirely. If, however, the throttle is opened farther, the increased motor suction tends to increase capacity of the contracted passage and in the effort to do so lifts the sleeve until a wider portion of it surrounds the opening of the nozzle. Incidentally the intake surrounding the lower, tapered end of the sleeve is raised and the air passage capacity of this opening increased as well.

No. 1,055,352—to Charles J. Pembroke, Rochester, N. Y. Granted March 11, 1912; filed August 9, 1911.

Resilient Wheel Construction—In which a solid spoke is held in place by springs at both ends and two sides.

The wheel described in this patent includes a rigid central portion forming a hub H as well as a number of spoke-holding chambers S which are radially disposed around the hub. The rim R of the wheel surrounds the hub as a center, being held in relation thereto by means of spokes S1. The solid spokes are held in approximately constant distance with regard to H by means of coiled cushion springs C disposed at both ends of the spokes. The spokes are encased and the casings connected by parallel plates forming a wheel frame, solid portions of which project into the space between the two plates. There are guides G, a number of which is used on two sides of the spoke adjacent to the neighboring spokes, and between each guide and the frame portions adjacent to it cushioning springs are provided. The total compression of these springs is in excess of the torque of the wheel, so that the drive may be taken from the hub to the rim through the spokes, while the cushion springs at both ends of every spoke allow for the percussions caused by driving the wheel over the road inequalities.

No. 1,055,835—to Frederick F. Tighe, New York City. Granted March 11, 1913; filed August 24, 1911.

Shock Absorber—Embodying friction members and a toggle joint between the absorber and the car frame.

The shock absorber, Fig. 3, consists of an annular shell S, a centrally chambered, radially slotted core element C and floating shoes which engage the shell frictionally. In the chamber of the core there is a longitudinally grooved member, the grooves having convergent floors; wedge-like gibs work in the grooves and slots. A resilient toggle joint T connects the gibs and the shoes, one end of which joint is secured to the chassis frame. Means connected to the axle cause relative engagement of the grooved member and the gibs so as to wedge the toggle joint means, if the axle is moved relatively to the car chassis.

No. 1,053,417—to George Cushing Martin, Los Angeles, Cal. Granted February 18, 1913; filed March 19, 1910.

Pneumatic Tire Casing—In which a coating of vulcanized rubber holds the threads of the fabric at their elastic limit.

This patent deals with a tire casing, Fig. 4, having separated edges and comprising a body of fabric and a coating of vulcanized rubber. The fabric body has its threads uniformly tensioned in the casing structure to approximately the elastic limit of the material and the threads are held in this condition by the vulcanized rubber.

No. 1,055,744—to Nelson W. McLeod, St. Louis, Mo. Granted March 11, 1913; filed May 10, 1912.

Illuminated Number Plate—In which non-transparent numeral signs are secured to a glass plate, behind which a light is in position.

This patent describes a combination number plate and light, Fig. 5. The same comprises a box which has a reflector and a lamp; the front end of the box is open and a number of lugs are disposed along the inner edge of the box front. These lugs are threaded internally. A rectangular frame member formed of L bars is so shaped as to fit for receiving a glass and lips on the edges of the rectangular member are adapted to be bent against the back of the glass after it is in place in the frame of that member. Lugs on the L-shaped bars are threaded internally to register with the threaded operations of the lugs on the box, and screws project into both of each pair of registering lugs, number members being secured to the bars lying over the glass.

No. 1,055,813—to Warren H. Seaser, Fresno, Cal. Granted March 11, 1913; filed February 2, 1912.

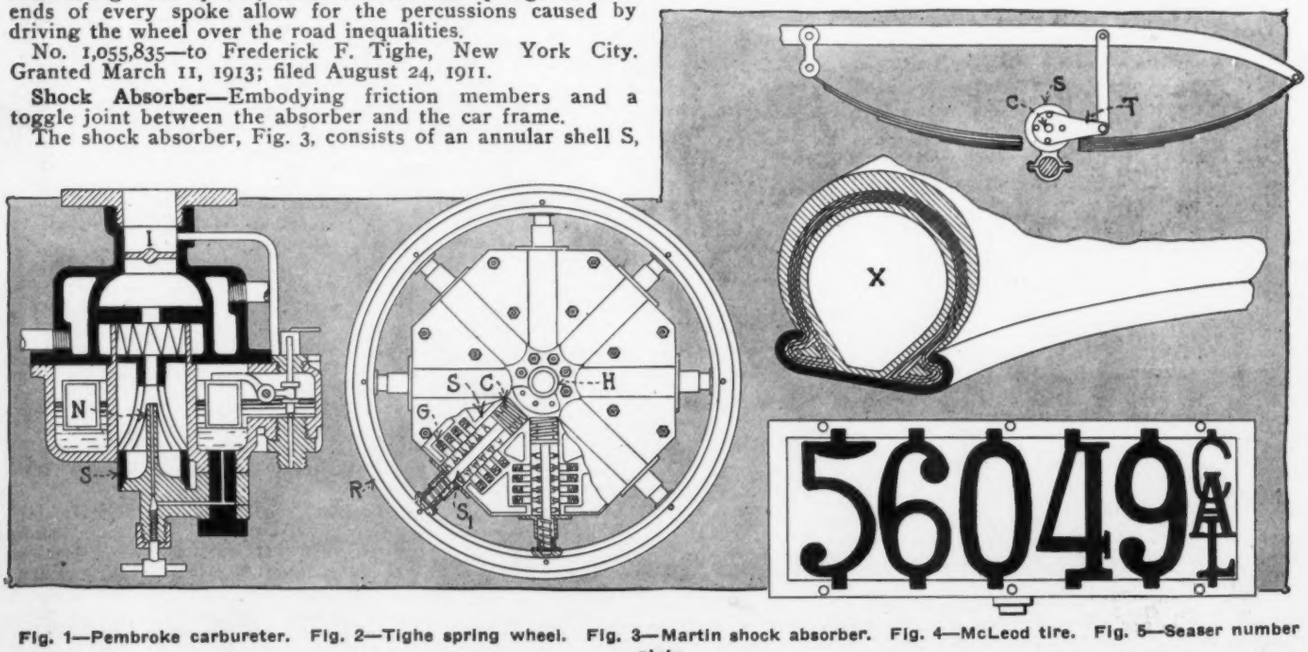


Fig. 1—Pembroke carbureter. Fig. 2—Tighe spring wheel. Fig. 3—Martin shock absorber. Fig. 4—McLeod tire. Fig. 5—Seaser number plate